

PUBLICLY AVAILABLE SPECIFICATION



The Institute of Asset Management

PAS 55-2

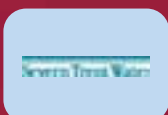
Asset Management

PART 2:

Guidelines for the application of PAS 55-1

ICS codes: 03.100.99

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Acknowledgement

The development of this Publicly Available Specification has been led by the Institute of Asset Management (IAM), with the assistance of the following co-operating organizations and individuals:

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Review Panel

In addition to sponsors, representatives of the following organizations were also part of the review panel and steering committee for the development of this PAS:

CIPFA (The Chartered Institute of Public Finance and Accountancy)
DfT (Department for Transport)
Halliburton KBR
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Ofgem (The Office of Gas and Electricity Markets)
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Photographs

The IAM gratefully acknowledges the contribution of photographs from the following organizations:

Health and Safety Executive
Lloyd's Register
National Grid Transco plc
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UK National Air Traffic Services Ltd
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This Publicly Available Specification comes into effect on 30 April 2004

© BSI 30 April 2004
ISBN 0-580-42766-8

Amended	Date	Comments

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Foreword

This part of PAS 55 contains guidelines for the application of PAS 55-1. Please note that the terms and definitions are contained in PAS 55-1, and are not repeated in this part. The presentation style is similar to that adopted in BS EN ISO 9004:2000 (Quality management systems – Guidelines for performance improvement) and OHSAS 18002:2000 (Occupational health and safety management systems – Guidelines for the implementation of OHSAS 18001).

The requirements specified in PAS 55-1 are reproduced in the outlined boxes and the associated guidance appears beneath these boxes.

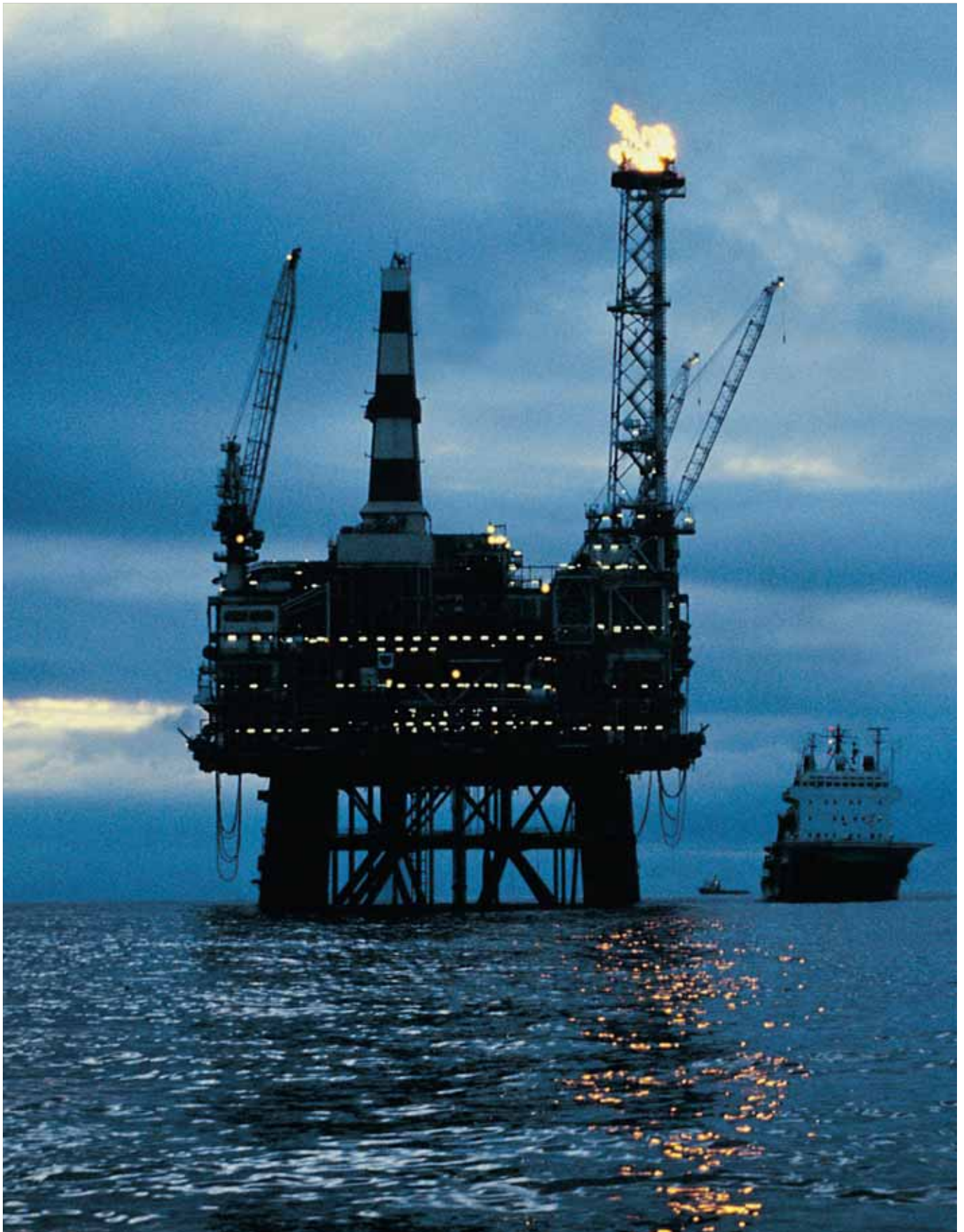
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0.1 General

There are numerous tools associated with asset management that are widely available and employed by organizations. Such tools include value engineering, life cycle costing, reliability centred maintenance, risk based inspection, etc. However, it is essential for organizations to recognize that asset management cannot be achieved successfully through the use of these tools alone.

The successful implementation of asset management requires an approach that has many dimensions detailed as follows:

- holistic: looking at the big picture i.e. integrating the management of all aspects of the assets (physical, human, financial, information and intangible assets: see Figure 3), rather than a compartmentalized approach;
- systematic: a methodical approach, promoting consistent, repeatable decisions and actions, and providing a clear and justifiable audit trail for decisions and actions;
- systemic: considering the assets as a system and optimizing the system rather than optimizing individual assets in isolation;
- risk-based: focussing resources and expenditure, and setting priorities, appropriate to the identified risks and the associated cost/benefits;
- optimal: establishing the optimum compromise between competing factors such as performance, cost and risk, associated with the assets over their life cycles;
- sustainable: considering the potential adverse impact to the organization in the long term of short term decisions aimed at quick wins. This requires achieving the optimum compromise between performance, costs and risks over the assets' life cycle or a defined long term. This would be difficult to achieve with separate capital and operating expenditures and annual accounting cycles.

These dimensions are illustrated in Figure 1.

It requires processes that are driven effectively by top management and supported by empowered and competent employees. It also requires a proactive, consistent and calculated way of working to make the appropriate decisions on matters such as capital investments, maintenance plans, levels of spares held, etc. The performance required from the assets and the associated expenditure should be set as precisely as is practicable. This requires clear objectives that can be translated into measurable performance targets for the assets.



Where possible, performance requirements and significant risks (such as asset failure) need to be quantified in financial terms to enable like-for-like comparison and for the associated expenditure to be set accordingly. For example, in some instances it could be more cost-effective to allow an asset to run to failure, whilst in other cases an increase in maintenance expenditure/capital investment might be more appropriate. It is not always possible to place a monetary value on such things however, some organizations overcome this issue by turning the question around and asking for example, "what would we be prepared to pay to avoid harm to our reputation". An organization should have confidence in and be able to justify its performance targets and the associated expenditure for achieving those targets.

Figure 1 - The dimensions of successful asset management



Experience indicates that for asset intensive organizations there are usually more potential tasks to carry out than resources, time or budgets will permit. The continuous optimizing and prioritizing of tasks and plans are a way of life for such organizations.

A key characteristic of successful asset management is consistently making sound decisions and good compromises, and carrying out the appropriate tasks at the right time and at the optimum level of expenditure. Above all it requires the commitment of top management, and it is unlikely that an organization will successfully integrate and optimize their asset management without such commitment. It also requires a motivated workforce supported by an effective asset management system, adequate and appropriate information and only thereafter, the usage of various asset management tools.

For some organizations this might require a change in culture and it might challenge existing ways of thinking and working.



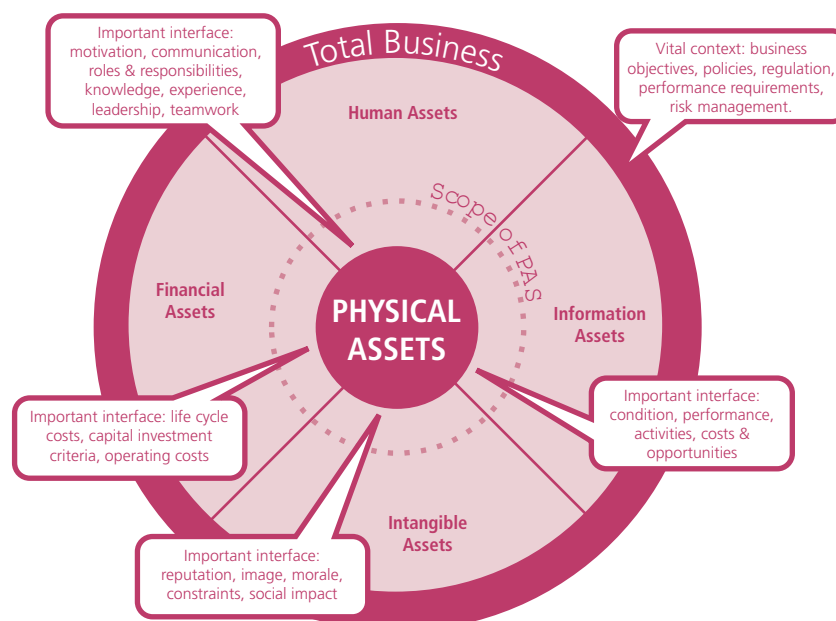
Increasingly stakeholders such as customers, the public, regulators and shareholders are seeking assurance that the asset management system of those organizations that rely on critical assets for safety, continuity of service and financial performance, is sound. Organizations are all too aware of the impact that adverse public opinion and negative press can have on their business when assets fail and such incidents have been widely publicized in the press and on television. For most organizations adopting a formal asset management system is increasingly becoming a necessity rather than an option.

0.2 Context for the management of physical assets

Figure 2 is one way of illustrating the critical elements of a business that are required to deliver (or could hinder the delivery of) the organizational strategic plan. These critical elements have been summarized into five categories of asset types as follows:

- physical assets (natural resources, infrastructure, machinery, plant, equipment, buildings, IT systems);
- human assets (leadership, management, workforce, skills, knowledge and experience);
- financial assets (cash, investments, equity, credit rating);
- information assets (data and information);
- intangible assets (reputation, customer and staff impression, public image/relations, brand value, licenses, patents, trademarks, copyrights and culture).

Figure 2 - Scope and business context of this asset management PAS in relation to the other critical categories of assets



Although the other four categories of asset types are also critical and need appropriate consideration, the scope of this Publicly Available Specification is limited to the management of physical assets and therefore they are considered in this Publicly Available Specification only insofar as they affect the optimal management of the physical assets.

For example:

- human assets: the attitude, knowledge and capabilities of the workforce have a fundamental influence on the performance of the physical assets;
- financial assets: financial resources are required for infrastructure investments, operation, maintenance and materials;
- information assets: good quality data and information are essential to develop, optimize and implement asset management plans;
- intangible assets: the organization's reputation and image can have a significant impact on infrastructure investment and operating strategies and associated costs.

Most asset-intensive organizations will recognise that the above influences can have a profound impact on the overall performance of their physical assets and therefore will need to be managed holistically.

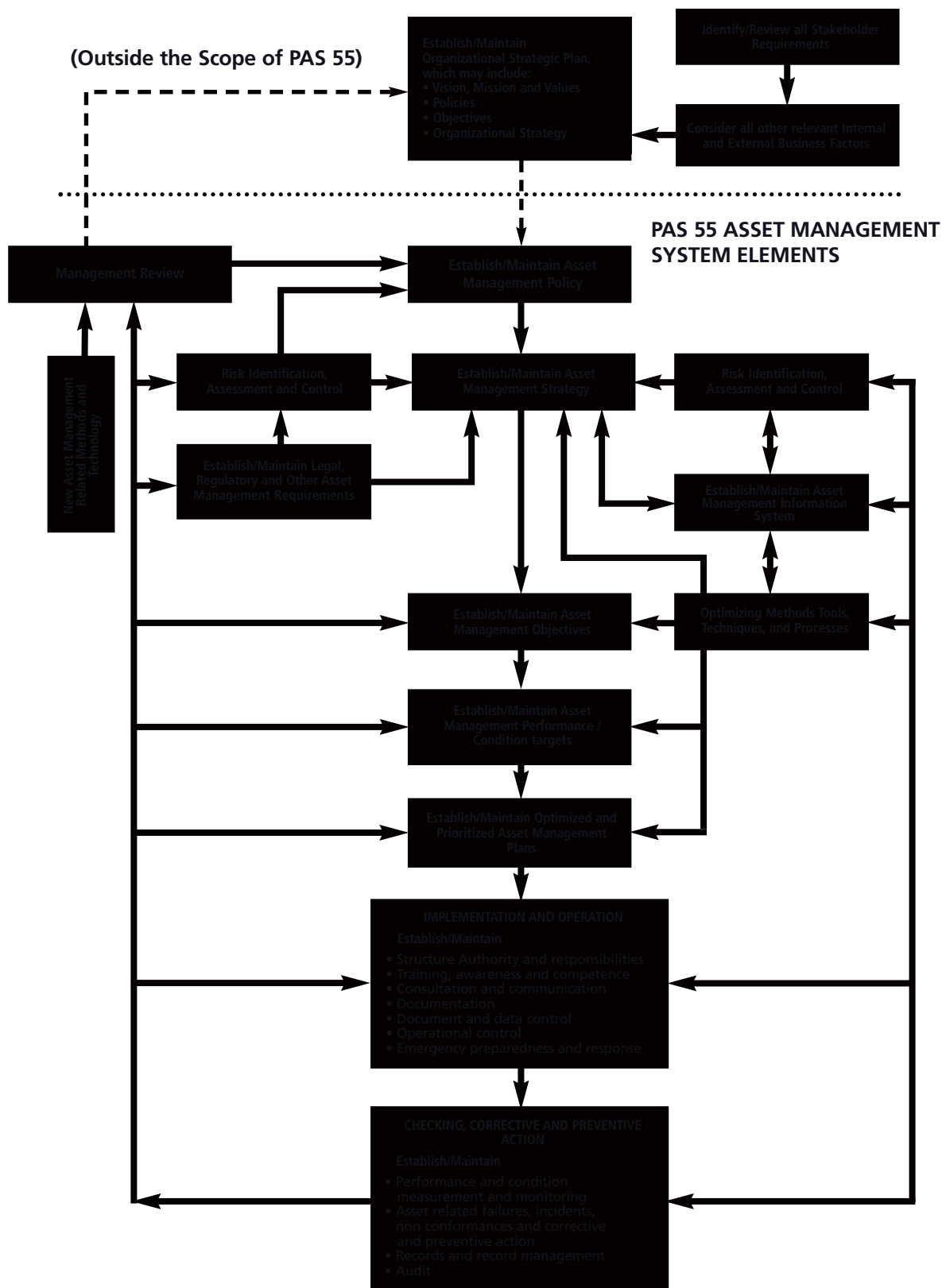
0.3 Asset management related questions

In order to achieve its organizational strategic plan and provide the assurance its stakeholders seek, an organization needs to ask and to be able to answer the following key questions:

- Do we know what assets we have, where they are, what condition they are in, what function they perform and their contribution to value? Do we know the quality of our reference data?
- Do we know what we want from our assets in the short, medium and long term?
- Can our assets deliver our business objectives cost-effectively?
- Are we getting the most value from our assets? (How could we get more value for money from them?)
- Do we have enough capability? Have some assets become redundant, underused, unprofitable, and too expensive? Are the asset's condition, performance and capabilities being maintained at optimum levels of investment?
- Are we confident that the risks of our assets causing harm to people and the environment are tolerable and at organizational/legally accepted levels?
- Is our asset-related expenditure (capital investment and operating costs) insufficient, excessive or optimal and correctly assigned across asset classes? Can we readily evaluate the benefits (performance, risk reduction, compliance) of proposed work or investment and, conversely, quantify the total cost/risk impact to the business of *not* performing such work or *not* investing?
- Are we "mortgaging the future" in our efforts to obtain short-term gains?
- Have we given due consideration to the other aspects of the business that affect our asset management plans, such as people, knowledge, finance and intangible assets? Conversely, have we considered the impact of our asset management plans on these aforementioned aspects?
- Do we review the appropriateness of our asset management strategy in the light of changes in the business environment?
- Are we continually improving the asset management system (processes) and asset management performance, and realizing the benefits of the improvements? Do we know what and where improvements will be most effective?
- Can we answer all of these questions confidently, with a clear audit trail, and demonstrate the answers to our stakeholders?



Figure 3 - Scope of this Publicly Available Specification, and process diagram



1 Scope

This part of PAS 55 provides guidelines for the interpretation and application of the requirements specified in PAS 55-1.

It provides further clarification on the intent of the requirements in PAS 55-1 and general guidance on the essential considerations against each requirement. It does not prescribe mandatory approaches to the implementation of the requirements but rather aids understanding and implementation by means of examples and illustrations.

This part of PAS 55 does not create any additional requirements to those specified in PAS 55-1.

2 Normative references

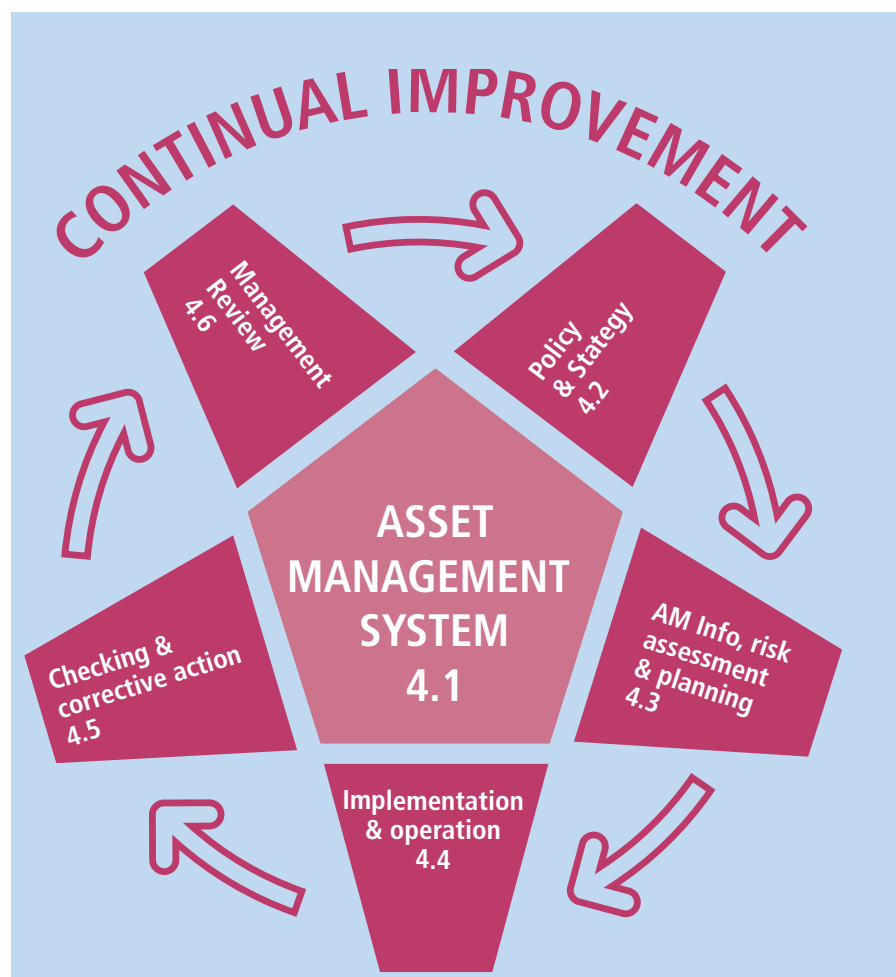
There are no normative references at present.

3 Terms and definitions

For the purposes of this part of PAS 55, the terms and definitions given in PAS 55-1 apply.

4 Asset management system elements

Figure 4 - Asset management system elements



4.1 General requirements

The organization shall establish, document, implement and maintain an asset management system and shall continually improve its effectiveness in accordance with the requirements set out in the whole of Clause 4. The organization shall define the scope of its asset management system. Where an organization chooses to outsource any process that affects conformity with these requirements, the organization shall ensure control over such processes. Control of such outsourced processes shall be identified within the asset management system.

a) The organization should establish and maintain a management system that conforms to all of the requirements of PAS 55-1. This should also assist the organization in meeting applicable legal, regulatory, statutory and other asset management related requirements that are applicable to it.

b) The level of detail and complexity of the asset management system, the extent of documentation and the resources devoted to it are dependent on the size of an organization and the nature of its activities. The system should be of appropriate depth, detail and coverage to enable the organization to meet all of the requirements of PAS 55-1.

NOTE Some organizations call this an *Asset Management Regime* or an *Asset Management Business Model*.

c) An organization has the freedom and flexibility to define the boundaries of the asset management system and may choose to implement PAS 55-1 with respect to the entire organization, or to specific operating systems or units of the organization. However, care should be taken in defining the boundaries and scope of the asset management system. Organizations should not attempt to limit their scope so as to exclude an operation or activity required for the successful delivery of the organizational strategic plan.

d) It is likely that the organization's asset management system draws upon processes already in existence and controlled within its quality, environmental and health and safety management systems, etc. While there is no need to establish a separate asset management system in such cases, care should be taken to ensure that processes work together to form an effective overall system, and that there is effective control of this entire system by the relevant management and other personnel.

e) Where an organization chooses to outsource any of the requirements (or part requirements) set out in the whole of PAS 55-1:2004, Clause 4 then the organization is required to ensure control over such processes. For example another organization may be contracted to develop the asset management plans and to carry them out. In such instances it is essential that the flow of inputs and outputs and control of the asset management system are maintained. In this example the organization would have to ensure that the asset management plans were consistent with its asset management policy, strategy, objectives and targets. Furthermore, it would also have to ensure that all of the other requirements of PAS 55-1:2004, Clause 4 could be carried out, e.g. operational control, performance measurement and monitoring audit.

4.2 Asset management policy and strategy

4.2.1 Asset management policy

The organization's top management shall authorize an overall asset management policy. The policy shall:

- a) be derived from, and be consistent with, the organizational strategic plan;
- b) be consistent with other organizational policies;
- c) provide the framework which, together with the organizational strategic plan, enables the asset management strategy and specific asset management objectives, targets and plans to be produced;
- d) be consistent with the organization's overall risk management framework;
- e) be appropriate to the nature and scale of the organization's assets and operations;
- f) clearly state the overall/broad asset management objectives;
- g) clearly state that asset management shall be directed to achieve the organizational strategic plan;
- h) include a commitment to continual improvement of the asset management process;
- i) include a commitment to comply with current applicable legislation, regulatory and statutory requirements and with other requirements to which the organization subscribes;
- j) be visibly endorsed by top management;
- k) be documented, implemented and maintained;

- l) be communicated to all relevant employees and relevant third parties including contractors with the intent that these persons are made aware of their individual asset management-related obligations;
- m) be available to stakeholders where appropriate;
- n) be reviewed periodically to ensure that it remains relevant and consistent with the organizational strategic plan.

NOTE 1: Organizations may choose to have a detailed asset management policy for internal use which would provide sufficient information and direction to drive the asset management system (parts of which may be confidential) and have a summarized (non-confidential) version containing the broad objectives for dissemination to its stakeholders.

NOTE 2: There may also be functional asset management policies for the key asset management related tasks to provide guidance to managers and a clear framework in which decisions can be made e.g. functional policy for capital investment.

a) The asset management policy is a means for top management to communicate to its managers, employees and stakeholders the organization's position and intentions with regard to asset management. It provides a high level statement of the organization's principles, approach and expectations relating to asset management. For example, the policy might start with the following:

We are committed to maximising our shareholder's investments in a legally and environmentally compliant and sustainable manner, without compromising the health and safety of our employees, customers, or the public. We shall achieve this by ...

b) Top management should produce the asset management policy. The steps to forming, implementing and maintaining the asset management policy would typically be as follows.

- 1) Identify the requirements of the organizational strategic plan related to the management of the assets. These should reflect the requirements and, potentially, conflicting expectations of the organization's stakeholders. Consider the organization's vision, mission, values, policy(s), risks, objectives, strategy, constraints, boundaries, timescales and responsibilities.
- 2) Identify all legal, regulatory, statutory and other asset management requirements.
- 3) Develop and agree the draft asset management policy at top management level. It is essential that the asset management policy is consistent with the organizational strategic plan otherwise the organizational plan might not be delivered. This is also essential because the asset management policy should play a leading part in driving the asset management system.
- 4) Discuss the draft policy with the organization's relevant managers, employees and other stakeholders. Amend accordingly to achieve an appropriate level of consensus.
- 5) Ensure the policy can be understood by all those to whom it is to be communicated.
- 6) Communicate the asset management policy to the relevant managers, employees and stakeholders. This can be achieved by posting the document on notice boards, intranet, internet and by face-to-face activities such as briefings, etc. Many organizations display the policy prominently within their premises. Others use electronic means e.g. via an intranet.
- 7) Ensure that the asset management policy has been communicated to all relevant personnel, and that it is understood and accepted.
- 8) Ensure that the asset management policy remains relevant and is being complied with. It is essential that the asset management policy remains "alive" and relevant to the changing influences of business drivers and obligations.

c) A policy statement could be used in a court of law, either in favour of the organization or against it. Therefore it would be prudent to have it reviewed by a person who is competent in legal matters.

d) Adherence to the asset management policy is critical to the effective, efficient and safe management of an organization. Top management should therefore provide adequate arrangements to ensure that policies are adhered to.

e) Asset management functional policies, supporting the overall asset management policy, provide a framework for the control of a specific asset management related activity. They provide the workforce with clarity for what is expected of them and the boundaries for any permissible deviance. They assist managers to implement stated asset management objectives and plans, and they should also constrain them within carefully defined boundaries. For example, the following policy would require the production of a maintenance plan but it would also prevent a manager from simply employing the manufacturer's recommendations for maintenance activities:

Maintenance plans will be designed using best available techniques as appropriate and shall incorporate a cost/benefit and risk-based approach.

However, when formulating functional policies, care should be taken not to conflict with other such policies or restrict managers to the extent that they are unable to take appropriate action for the optimal life cycle management of the assets. Similarly, the functional policies should be appropriate to the criticality and value of the assets to which they apply. Using the same example above, such a policy could be more tightly defined to focus on optimizing maintenance tasks that, for example, are either critical or above a certain cost as follows:

Maintenance plans will be designed using best available techniques, appropriate to the asset's HSE and performance criticality and its value, and shall incorporate a cost/benefit and risk-based approach to their extent and timing.

f) Organizations could have a number of asset management functional policies. Typically these may include:

- asset accounting and activity costing;
- maintenance, inspection, condition and performance monitoring;
- asset operation;
- planning and budgeting;
- capital investment and life cycle costing;
- contingency planning and emergencies;
- data, information and knowledge management;
- demand management and customer expectation policy;
- energy efficiency and environmental aspects e.g. renewable resources, recycling, waste management, air purity, hygiene;
- human resources, skills development and competencies;
- innovation and change management;
- asset modifications, replacement, disposal, recycling;
- risk assessment and management;
- safety, health and environmental management;
- spares, materials and purchasing;
- contractor and supplier management;
- interfacing with regulatory bodies.



4.2.2 Asset management strategy

The organization shall establish and maintain a long-term asset management strategy.

The strategy shall:

- a) be derived from and be consistent with the asset management policy and the organizational strategic plan;
- b) be consistent with other organizational strategies;
- c) identify and clearly state the function(s), performance and condition requirements of its assets, asset types or asset systems as appropriate. These function(s), performance, and condition requirements shall include the consideration of the provision of service(s) and/or products to its customers. It shall also identify and consider the requirements of all other relevant stakeholders including health, safety, sustainability and environmental performance requirements;
- d) take account of the risk assessment (see 4.3.2) and identify those assets or asset systems that are critical;
- e) be optimized;
- f) provide sufficient information and direction, including an action plan with defined timescales, and responsibilities to enable effective asset management objectives, targets and plans to be produced;
- g) consider the life cycle of the assets, asset types or asset systems;
- h) be reviewed periodically to ensure that it remains effective and consistent with the asset management policy and organizational strategic plan. Where necessary the strategy shall be amended accordingly.

a) The asset management policy should drive the asset management system and the asset management strategy should provide the high level description of steps and activities for implementing this policy. The asset management strategy should set out the most appropriate long term course of action for implementing the asset management policy and thereby supporting the delivery of the organizational strategic plan. The duration of "long term" will be dependent on the asset management policy and also vary from one organization to another and from one industry sector to another.

It is essential that the asset management strategy is realistic, well thought out, of appropriate detail and has taken into account the views of all relevant stakeholders, otherwise the organization might end up performing unnecessary or inappropriate tasks or failing to meet key business objectives.



b) When establishing and reviewing its asset management strategy, an organization should consider the following items:

- stakeholder requirements/expectations that influence the management of the assets including legal, regulatory, statutory and other asset management requirements;
- its asset management policy, organizational strategic plan and other organizational strategies;
- the previous asset management strategy (if applicable) and any need for a transition plan;
- existing asset management plans (if applicable);
- changes in priorities that the organization is aware of, or that might arise in the future;
- the forecast demand for the service or the product (including demographic and geospatial information and relevant trends);
- the predicted availability and cost of necessary resources, raw materials and essential supplier services;
- asset-related risks;
- the physical condition of the assets, age profile, flexibility and suitability for the desired usage;
- asset deterioration mechanisms, and failure modes and effects;
- historical asset-related information such as reliability, maintenance records, operational performance and condition data;
- criteria for capital investments and for comparing options;
- methods for determining optimum operating and maintenance strategies, including resources, task justifications and intervals, processes, procedures and standards;
- methods for efficient delivery of work and resources, such as work management systems, project and resource planning;
- constraints including legal, regulatory, statutory, financial, resources, physical access, logistics and timescales;
- the results of benchmarking, audit results and assessments of current and best practices;
- the results of the management review (see 4.6);
- performing scenario planning, "what-if" analysis, and contingency planning, i.e. considering the effects of unexpected events and possible responses. Scenario planning can become a complex task, and therefore techniques such as computer modelling should be considered;
- performing sensitivity analysis: changing the values of key variables and assumptions in order to determine which are the most sensitive to fluctuations, thereby identifying risks and any requirements for improving the accuracy of the analysis. This is normally performed on a computer based financial model;
- looking for opportunities to achieve the asset management strategy in a more cost effective way, i.e. obtaining the same objective for less than the budgeted amount without comprising sustainability or risk exposure levels. Such opportunities can be identified through advances in technology, management practices, contractual arrangements, partnering, etc.
- looking for opportunities for adding value, i.e. increasing the worth of an asset/asset system compared to its costs, e.g. generating income from sharing an underused asset/asset system with another operator.

c) The asset management strategy should demonstrate how the asset management policy is to be implemented (and support the organizational strategic plan). It should include the following items:

- the desired outcomes related to the (existing or new) asset(s);
- the details of broad plans and programmes to achieve these desired outcomes with defined timescales and responsibilities. These should also include details of the resources that are needed to deliver the plans and the actions required to secure them;
- the assumptions made and financial costing if appropriate;
- the targets against which the performance of the asset management strategy can be measured (see 4.5.1).