

PAS 55-1:2008

Asset Management

Part 1: Specification for the optimized management of physical assets

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Acknowledgement

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Steering Group

- John Woodhouse
Project Chairman, IAM
- Aled Williams
National Grid
- Dr Navil Shetty
Atkins
- Mike Dixon
EDF Energy
- Prof Steven Male
University of Leeds
- Rhys Davies
Lloyd's Register

Development team

- Moss Mustafa
- Ursula Bryan
National Grid
- Peter Jay
The Woodhouse Partnership
- Alex Thomson
The Woodhouse Partnership

Review Panel

Representatives of the following organizations were part of the review panel for the development of this PAS:

- AMCL
- AMT-Sybex
- Atkins
- Atlantic LNG Co of Trinidad & Tobago
- BAE Systems (Operations) Ltd
- BC Transmission Corporation
- CE Electric UK
- CLP Power
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- EDF Energy Networks
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- Gas Transport Services B.V.
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- GVB
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- Halcrow
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- KEMA
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- Network Rail
- PB Power
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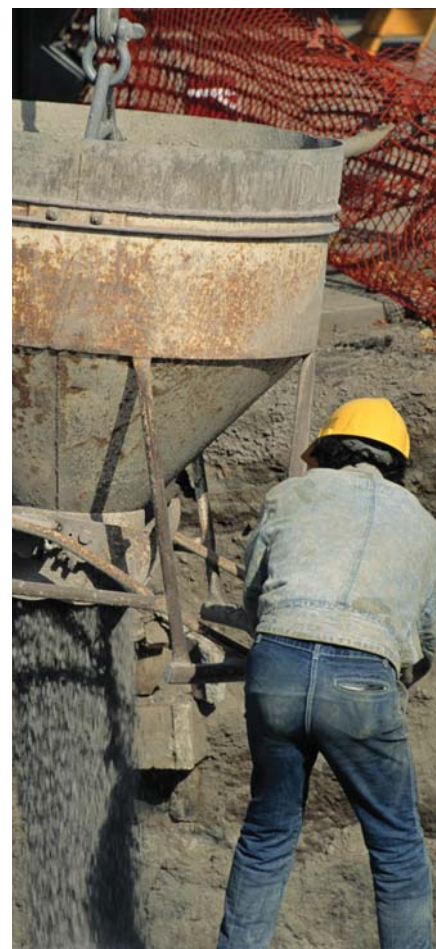
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Foreword

This Publicly Available Specification (PAS) was first published in 2004 in response to demand from industry for a standard for asset management. It is applicable to any organization where physical assets are a key or a critical factor in achieving its business goals. This 2008 revision reflects the increasing international consensus about required good practices in the management of such physical assets.

To ensure consistency with other related management system standards and to facilitate its alignment or integration, it was considered that asset management would be best standardized as a specification, with the information on implementing asset management distilled into key requirements. The criterion for including such requirements has been that, without them, the asset management system would be regarded as deficient.

This PAS has been based on the familiar BS ISO format comparable with widely adopted standards such as BS EN ISO 14001 and BS OHSAS 18001 (see Annex A).

This PAS is published in two parts:

- Part 1: Specification for the optimized management of physical assets; and
- Part 2: Guidelines for the application of PAS 55-1.

It has been assumed in the preparation of this PAS that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Consultation

This PAS has been developed in consultation with a large number of international organizations and individuals from a wide range of industries that are active and proficient in the field of asset management (see Acknowledgements).

Publishing information

This PAS comes into effect on 15 September 2008.

This PAS has been prepared and published by BSI, which retains its ownership and copyright. BSI reserves the right to withdraw or amend this PAS on receipt of authoritative advice that it is appropriate to do so. This PAS will be reviewed at intervals not exceeding two years, and any amendments arising from the review will be published as an amended PAS and publicized in *Update Standards*.

This PAS is not to be regarded as a British Standard.

Supersession

PAS 55-1:2008 and PAS 55-2: 2008 supersede PAS 55-1:2004 and PAS 55-2:2004, which remain current and obsolescent until 1 March 2010 when they will be withdrawn.

***NOTE** Obsolescence is declared where the content of a standard, which is superseded by new provisions (in the form of a new standard), still retains a commercial need or relevance (to a specific technology, industry or process). The document is superseded but it is not withdrawn.*

Information about this document

This is a full revision of PAS 55-1:2004, which introduces the following principal changes:

- The term “infrastructure” has been removed from the **title** of the PAS;
- The **Foreword** and **Introduction** have been revised;
- **Figure 1** has been transferred and adapted from PAS 55-2:2004;
- **Figures 2, 4 and 6** have been revised and **Figures 3 and 5** are new;
- New **definitions** have been added, and existing definitions revised;
- Asset management objectives and asset management targets are now jointly referred to as **asset management objectives**, and their definition has been revised accordingly (see 3.5);
- The section on **Asset management plan(s)** (see 4.3.3) has been extended to more clearly identify the requirements for optimizing plans and the interaction between life cycle phases;
- The requirements for emergency preparedness and response have been extended to include continuity planning and the section has been renamed “**Contingency planning**” (see 4.3.4);
- A new section “**Asset management enablers and controls**” (see 4.4) has been created to consolidate the generic requirements of: structure, authority and

responsibilities; training awareness and competence; communication, participation and consultation; asset management system documentation; information management; risk management; legal and other requirements; and management of change;

- New requirements have been introduced for **Communication, participation and consultation** (see 4.4.4);
- **Information management** (see 4.4.6) brings together the requirements of the previous clauses for “Document, data and information control” and “Asset management information system”;
- **Management of change** is discussed in a separate clause (see 4.4.9);
- The requirements in the former “Operational control” have been divided between “Implementation of asset management plan(s)”, “Management of change” and “Asset management system documentation”;
- “Implementation of asset management plan(s)” has been expanded to address the **Life cycle phases** of managing assets (see 4.5);
- New requirements for **Evaluation of compliance** have been introduced (see 4.6.3);

- “Checking and corrective action” has been renamed “**Performance assessment and improvement**” (see 4.6), with the structure for the sub-clauses adapted from those described in PAS 99 and ISO Guide 72; and
- New requirements have been introduced for **Management review** (see 4.7).

Presentational conventions

The provisions of this PAS are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication is not intended to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with this PAS cannot confer immunity from legal obligations.



0 Introduction

0.1 What is asset management?

For the purposes of this PAS, asset management is defined in 3.2 as:

systematic and coordinated activities and practices through which an organization optimally and sustainably manages its assets and asset systems, their associated performance, risks and expenditures over their life cycles for the purpose of achieving its organizational strategic plan

and organizational strategic plan is defined in 3.25 as:

overall long-term plan for the organization that is derived from, and embodies, its vision, mission, values, business policies, stakeholder requirements, objectives and the management of its risks

Effective implementation of asset management requires a disciplined approach which enables an organization to maximise value and deliver its strategic objectives through managing its assets over their whole life cycles. This includes determination of appropriate assets to acquire or create in the first place, how best to operate and maintain them, and the adoption of optimal renewal, decommissioning and/or disposal options.

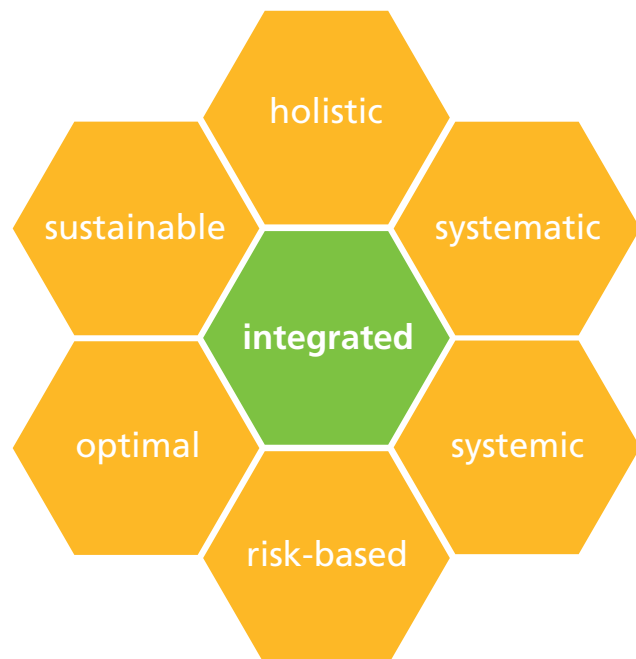
The principal benefits of optimized life cycle asset management, in no particular order, include:

- enhanced customer satisfaction from improved performance and control of product or service delivery to the required standards;
- improved health, safety and environmental performance;
- optimized return on investment and/or growth;
- long-term planning, confidence and performance sustainability;
- the ability to demonstrate best value-for-money within a constrained funding regime;
- evidence, in the form of controlled and systematic processes, to demonstrate legal, regulatory and statutory compliance;
- improved risk management and corporate governance and a clear audit trail for the appropriateness of decisions taken and their associated risks;
- improved corporate reputation, the benefits of which may include enhanced shareholder value, improved marketability of product/service, greater staff satisfaction and more efficient and effective procurement from the supply chain;

- the ability to demonstrate that sustainable development is actively considered within the management of the assets over their life cycles.

Such benefits are most often associated with the application of a number of key principles and attributes in the design and implementation of the asset management system (see Figure 1); these are explained further in PAS 55-2.

Figure 1 – Key principles and attributes of asset management



The following enabling elements are also considered to be essential for the successful implementation of these principles:

- an organizational structure that facilitates the implementation of these principles with clear direction and leadership;
- staff awareness, competency, commitment and cross-functional coordination;
- adequate information and knowledge of asset condition, performance, risks and costs, and the interrelationships between these.

0.2 Types of assets

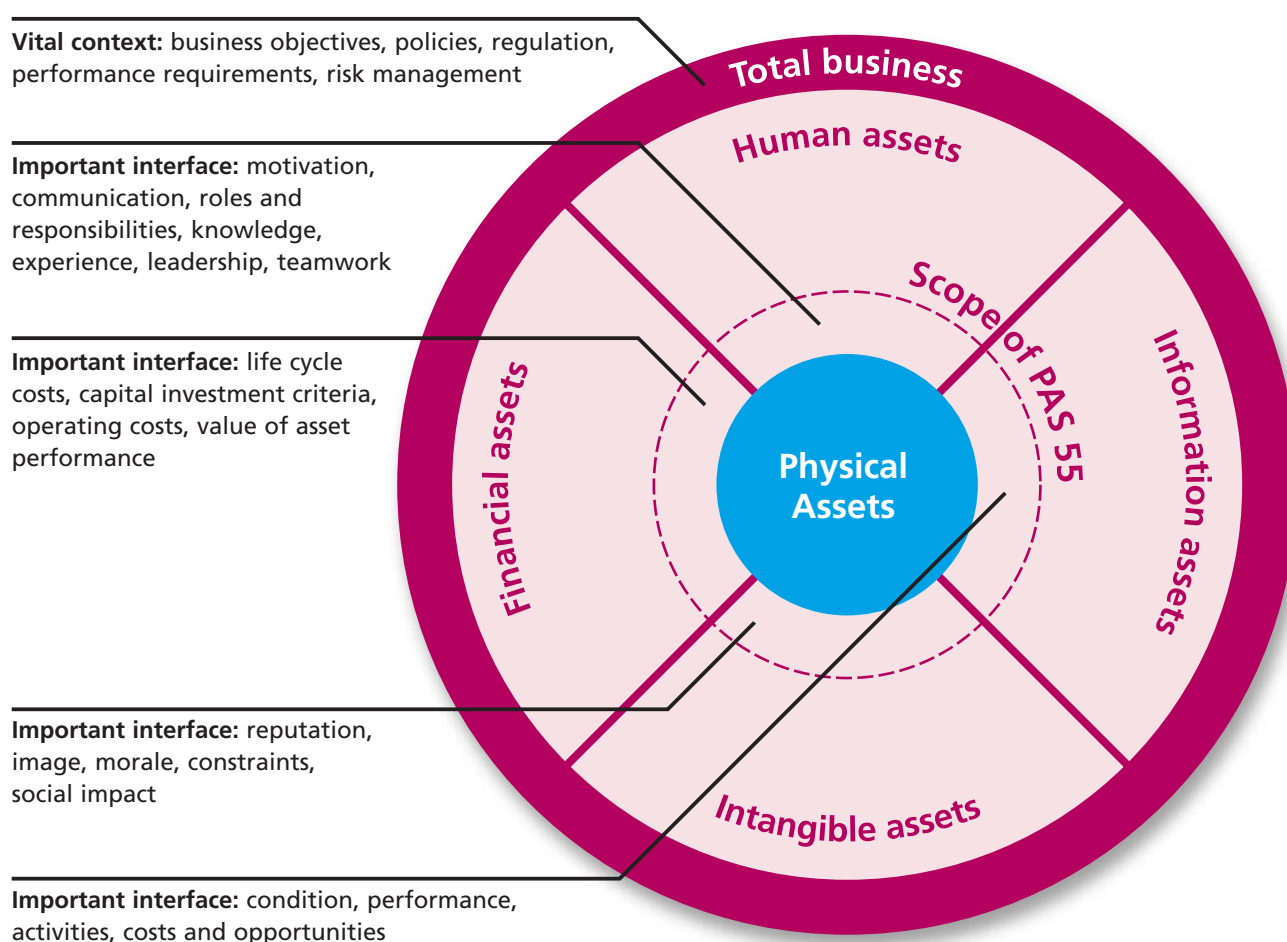
The physical assets (see 3.1) represent only one of the five broad categories of asset types that have to be managed holistically in order to achieve the organizational strategic plan. The other categories are human assets, information assets, financial assets and intangible assets (reputation, morale, intellectual property, goodwill, etc.).

The scope of this PAS is primarily focussed on the management of physical assets and asset systems (see 3.12). The management of physical assets and asset systems is inextricably linked to the other categories of assets; however, within this PAS the

other categories are only considered where they have a direct impact on the optimized management of the physical assets. These critical interdependencies are illustrated in Figure 2, which shows the scope of PAS 55 in relation to the other categories of assets.

Although human factors such as leadership, motivation and culture are not directly addressed within the scope of this PAS, they are critical to the successful achievement of optimized and sustainable asset management and require due consideration. This is applicable to the organization's owners, managers, employees, contractors and suppliers.

Figure 2 – Focus and business context of this PAS in relation to the other categories of assets



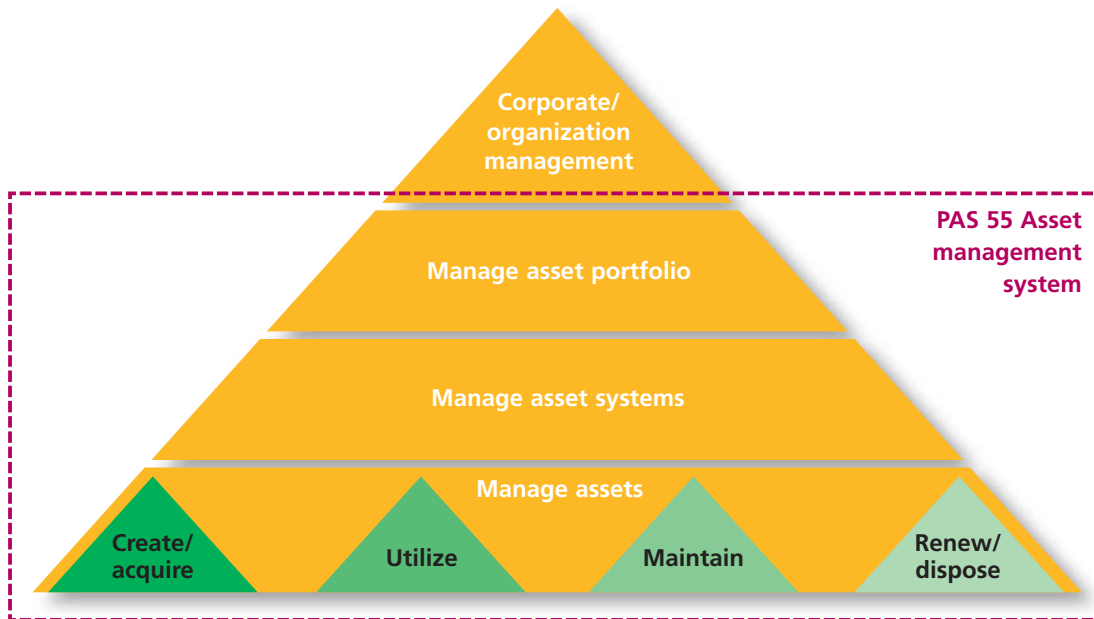
0.3 The need for an asset management system

This PAS is specifically intended to cover the life cycle management of the assets and, in particular, the assets that are core to an organization’s purpose, such as utility networks, power stations, railway or road systems, oil and gas installations, manufacturing and process plants, buildings and airports. An asset management system is therefore vital for organizations that are dependent on the function and performance of their physical assets in the delivery of services or products, and where the success of an organization is significantly influenced by the stewardship of its assets.

Delivering the best value for money in the management of physical assets is complex and involves careful consideration of the trade-offs between performance, cost and risk over all stages of the assets’ life cycles. There are inherent conflicting factors to manage, such as short-term versus long-term benefits, expenditures versus performance levels, planned and unplanned availability, or capital costs versus operating

expenditures. There are also different levels at which assets can be identified and managed – ranging from discrete equipment items or components to complex functional systems, networks, sites or diverse portfolios (see **Figure 3**). This hierarchy brings challenges and opportunities at different levels. For example, discrete equipment items may have identifiable individual life cycles that can be optimized, whereas asset systems may have an indefinite horizon of required usage. Sustainability considerations should, therefore, be part of optimized decision-making. A larger organization may also have a diverse portfolio of asset systems, each contributing to the overall goals of the organization, but presenting widely different investment opportunities, performance challenges and risks. An integrated asset management system is therefore essential to coordinate and optimize the diversity and complexity of assets in line with the organization’s objectives, priorities and chosen risk profile.

Figure 3 – Levels of assets and their management

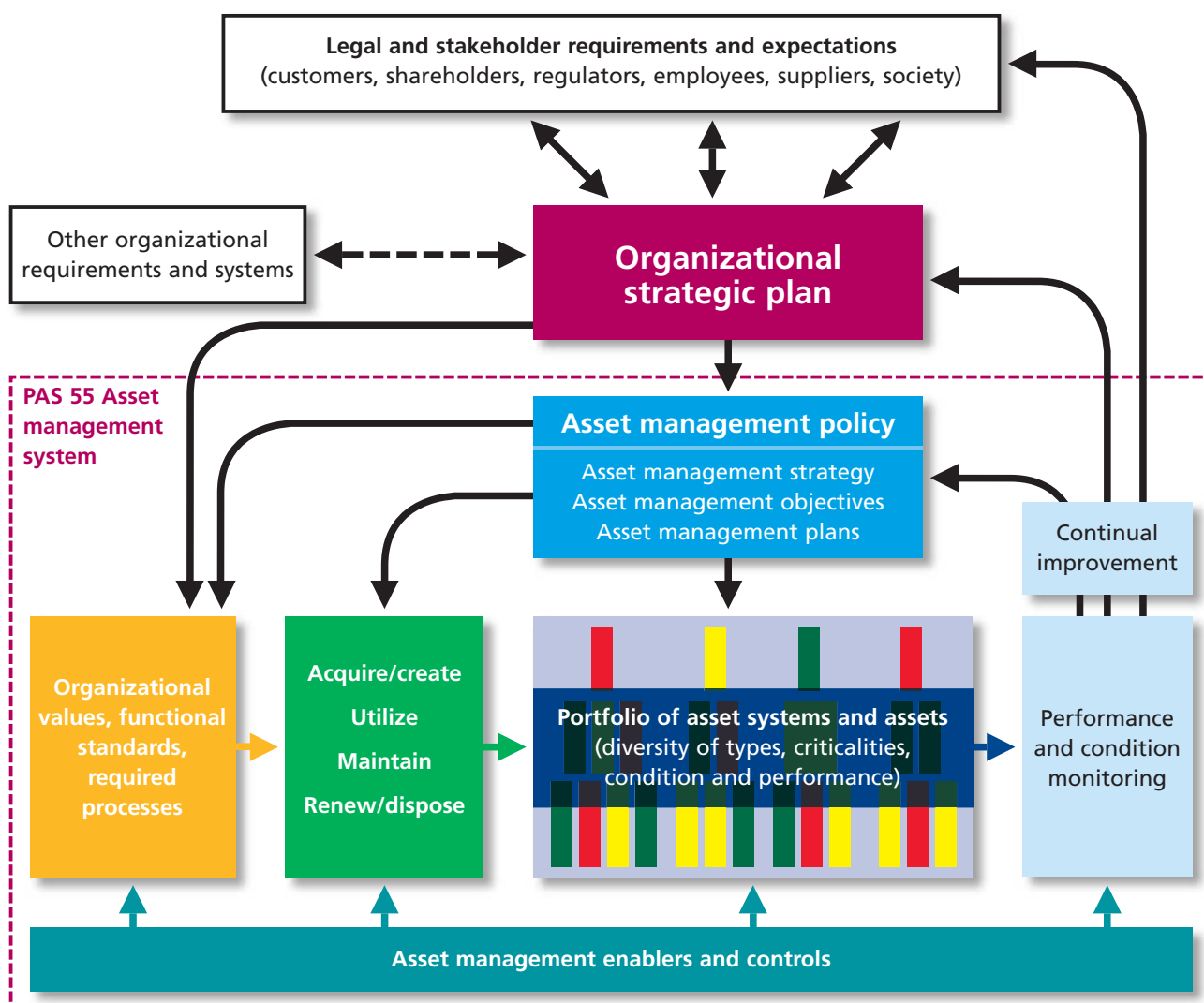


0.4 The structure of an asset management system

An asset management system is primarily designed to support the delivery of an organizational strategic plan in order to meet the expectations of a variety of stakeholders (see **Figure 4**). The organizational strategic plan is the starting point for development of the asset management policy, strategy, objectives and plans. These, in turn, direct the optimal combination of life cycle activities to be applied across the diverse portfolio of asset systems and assets (in accordance with their criticalities, condition, performance and

chosen risk profile of the organization). **Figure 4** highlights the importance of monitoring and continual improvements within the asset management system (for example, in the performance of assets or the optimization of the asset management plan(s)). It further demonstrates the importance of continual improvement externally through direct influence upon the organizational strategic plan and stakeholder expectations.

Figure 4 – Overview of the asset management system, its relationship to the organizational strategic plan and stakeholder expectations





The “line of sight” between organizational strategic direction and the day-to-day activities of managing assets is a vital component of the asset management system. This aligns the “top down” aspirations of the organization with the “bottom up” realities and opportunities of the assets. **Figure 5** shows the important planning and implementation elements of the asset management system that ensure such alignment.

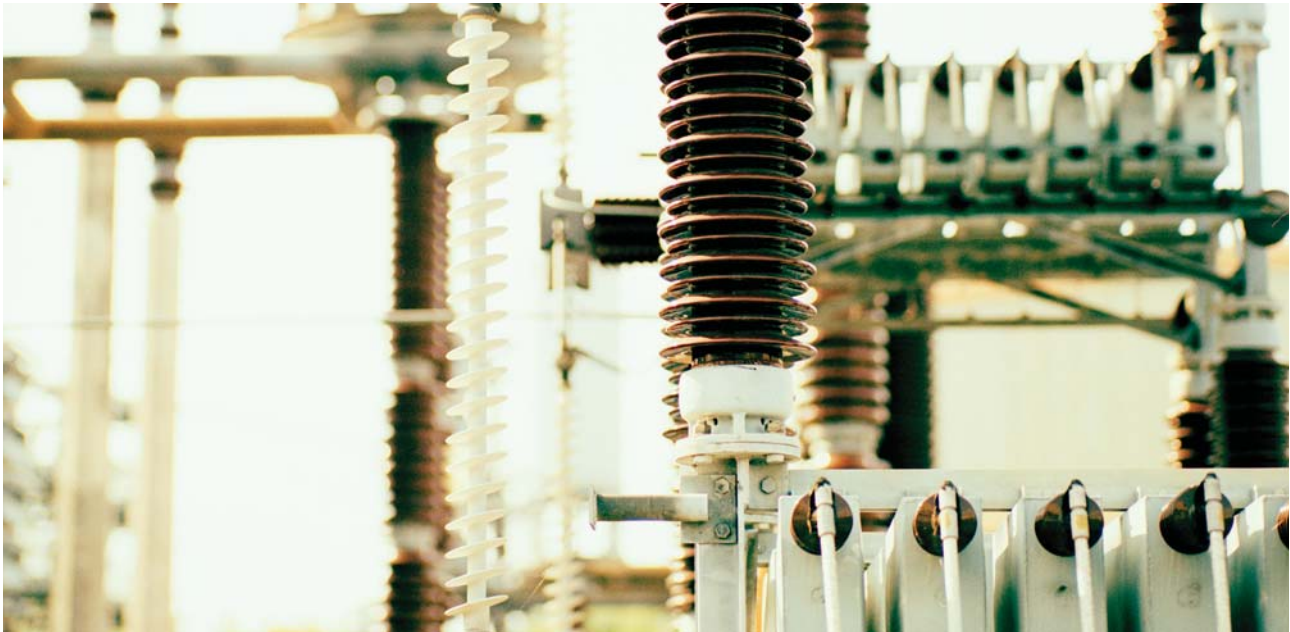
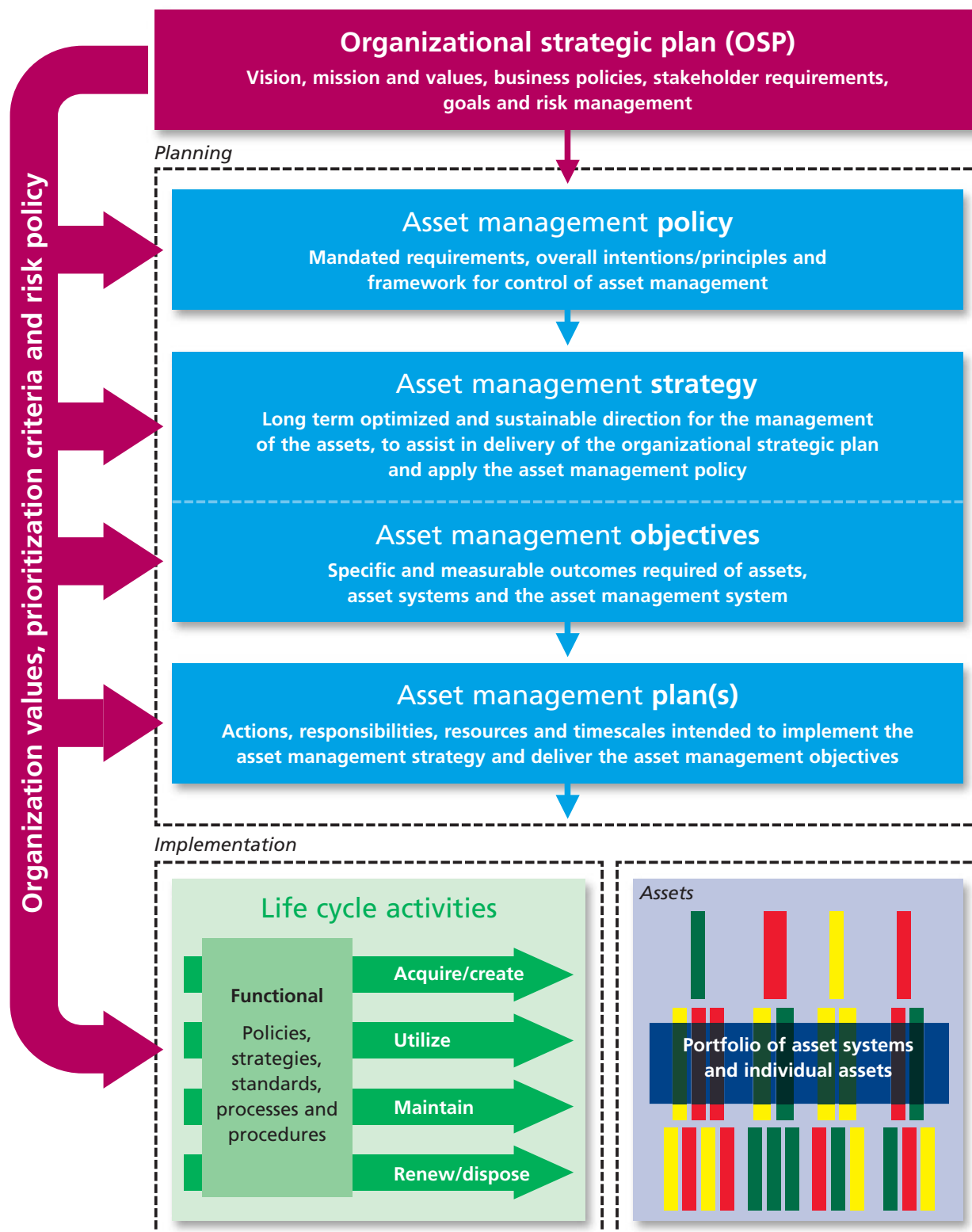


Figure 5 – Planning and implementation elements of an asset management system



0.5 Application of PAS 55

This PAS is applicable to:

- any asset intensive business, where significant expenditure, resources, performance dependency and/or risks are associated with the creation/acquisition, utilization, maintenance or renewal/disposal of assets;
- any organization that has, or intends to manage or invest in, a significant portfolio of assets, or where the performance of asset systems and the management of assets are central to the effective delivery of service, product or other business objectives;
- organizations where there is a business or public accountability requirement to demonstrate best value in the safe management of assets and provision of associated services (e.g. education and health sectors).

The requirements of this PAS are inextricably linked together and the document should be read in its entirety. Asset management is an inherently integrated approach, and cannot be successfully implemented by applying the requirements of this PAS in part.

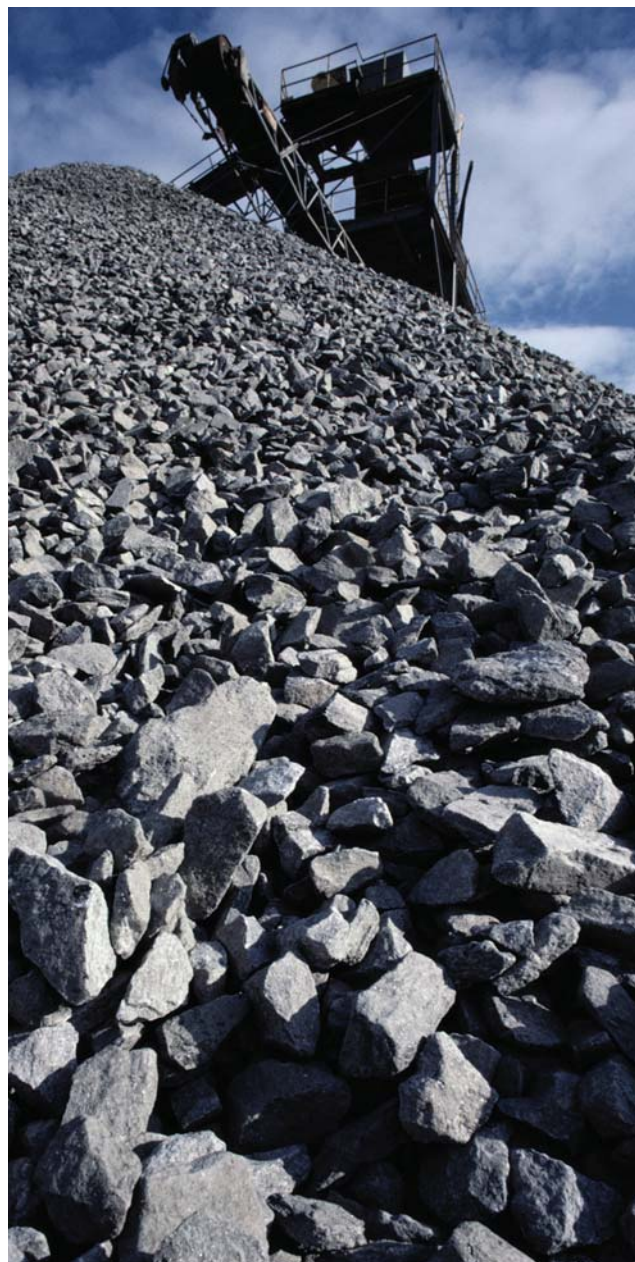
It is important to note that the requirements of this PAS are prescriptive only to the extent that they define *what* has to be done, not *how* to do it. The method of achieving each requirement is for the organization to determine, in accordance with its assessed needs. Guidelines for the application of the requirements within PAS 55-1 are provided in PAS 55-2. However, it is also important to note that the purpose of PAS 55-2 is to provide guidance only and does not add any further requirements to those contained in PAS 55-1.

The requirements within this PAS call for the organization to establish an asset management system, including an asset management policy, an asset management strategy, asset management objectives and asset management plan(s). To avoid confusion, these terms are always preceded by "asset management" if they relate to a specific clause, or appear on their own if the reference is generic, i.e. "asset management strategy" refers to a specific clause and "strategy" on its own would refer to strategy in general terms. It should also be noted that the term "asset management system" means the management system, and not a system of interdependent physical assets, which is separately referred to as an "asset system" (see 3.12).

Unless explicitly required, the documentation requirements within this PAS do not have to be produced as individual documents. There is no need,

for example, to produce a discrete asset management policy, asset management strategy, asset management objectives and asset management plan(s). These may be integrated with other relevant documents if appropriate.

The requirements of **Clause 4** can be met by adopting a process- or procedure-based approach. Procedure(s) can be simply written as descriptions of processes and, taken together with other elements of the system (such as defined responsibilities and authorities, trained and competent personnel), can provide the control required to meet the needs of the organization.



0.6 Integration with other management systems

Implementing this specification would enable an organization to align or integrate its asset management system with other related management systems. In order to enable organizations to develop integrated management systems that are aligned to standards, such as PAS 99 and BS OHSAS 18001, the requirements and structure of this PAS are arranged within the Plan-Do-Check-Act (PDCA) framework as follows (see **Figure 6**):

Plan establish the asset management strategy, objectives and plans necessary to deliver results in accordance with the organization's asset management policy and the organizational strategic plan

Do establish the enablers for implementing asset management (e.g. asset information management system(s)) and other necessary requirements (e.g. legal requirements) and implement the asset management plan(s)

Check monitor and measure results against asset management policy, strategy objectives, legal and other requirements; record and report the results

Act take actions to ensure that the asset management objectives are achieved and to continually improve the asset management system and asset management performance



Figure 6 Structure of PAS 55-1:2008



NOTE Figure 6 is adapted from PAS 99:2006.

1 Scope

This part of PAS 55 (PAS 55-1) specifies the requirements for an asset management system for the management of physical assets and asset systems over their life cycles. The management of physical assets is, however, inextricably linked to the management of other asset types (see **Figure 2**) and these other asset types are considered within the asset management system insofar as they have a direct impact on the management of physical assets.

NOTE For example, the optimal life cycle management of physical assets is heavily dependent upon information and knowledge, human assets and financial resources, and often has a significant impact on reputation and customer satisfaction.

This PAS is applicable to all sizes of business, from small to medium enterprises through to multinationals, and to any organization that wishes to:

- a) establish an asset management system to optimally and sustainably manage its physical assets over their life cycles or over a defined long-term period;

NOTE There may be an organizational need to manage asset systems optimally for an indefinite period into the future i.e. in perpetuity, in which case the defined long-term period should align with the time horizon of the organizational strategic plan and should include the life cycles of critical assets.

- b) implement, maintain and improve an asset management system;
- c) assure itself of its compliance with its stated asset management policy and strategy;
- d) demonstrate such compliance to others;
- e) seek certification/registration of its asset management system by an external organization;
- f) make a self-determination and self-declaration of compliance with this PAS.



2 Reference publications

There are no normative references at present (i.e. references indispensable to the full compliance with this PAS).

Informative references (i.e. publications that provide information or guidance) are listed in the Bibliography. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.



3 Terms and definitions

For the purposes of this PAS, the following terms and definitions apply.

3.1 asset(s)

plant, machinery, property, buildings, vehicles and other items that have a distinct value to the organization

NOTE 1 For levels of assets, asset systems and asset portfolio, see Figure 3.

NOTE 2 This definition includes any software code that is critical to the delivery of the function of the asset.

3.2 asset management

systematic and coordinated activities and practices through which an organization optimally and sustainably manages its assets and asset systems, their associated performance, risks and expenditures over their life cycles for the purpose of achieving its organizational strategic plan

3.3 asset management information

meaningful data relating to assets and asset management

NOTE Examples of asset management information include asset registers, drawings, contracts, licences, legal, regulatory and statutory documents, policies, standards, guidance notes, technical instructions, procedures, operating criteria, asset performance and condition data, or all asset management records.

3.4 asset management information system

system for the storage, processing and transmission of asset management information

NOTE The storage or transmission of asset information can be achieved via multiple types of media.

3.5 asset management objective(s)

- a) specific and measurable outcome or achievement required of **asset system(s)** in order to implement the **asset management policy** and **asset management strategy**; and/or
- b) detailed and measurable level of performance or condition required of the **assets**; and/or
- c) specific and measurable outcome or achievement required of the **asset management system**.

3.6 asset management performance

measurable results of an organization's management of its assets and/or asset system(s)

NOTE 1 Results are normally measured against the organization's strategic plan, asset management policy, asset management strategy, asset management objectives and/or other asset management performance requirements.

NOTE 2 Asset management performance may include the effectiveness of expenditures, the reliability, efficiency, quality, sustainability and value of the assets and their utilization, and/or the impact of assets and asset management upon the organization's financial performance, health and safety performance, environmental performance, compliance and reputation.

NOTE 3 Asset management performance measurement includes measuring the effectiveness of the organization's asset management system.

3.7 asset management plan

document specifying activities and resources, responsibilities and timescales for implementing the **asset management strategy** and delivering the **asset management objectives**

3.8 asset management policy

principles and mandated requirements derived from, and consistent with, the **organizational strategic plan**, providing a framework for the development and implementation of the **asset management strategy** and the setting of the **asset management objectives**

3.9 asset management strategy

long-term optimized approach to management of the assets, derived from, and consistent with, the **organizational strategic plan** and the **asset management policy**

NOTE 1 The asset management strategy converts the objectives of the organizational strategic plan and the asset management policy into a high-level, long-term action plan for the assets and/or asset system(s), the asset portfolios and/or the asset management system.

NOTE 2 The high-level, long-term action plans for the assets and the asset management objectives are normally the outputs of the asset management strategy. These elements together form the basis for developing more specific and detailed asset management plan(s).

3.10 asset management system

organization's **asset management policy**, **asset management strategy**, **asset management objectives**, **asset management plan(s)** and the activities, **processes** and organizational structures necessary for their development, implementation and continual improvement

NOTE 1 A management system is a set of interrelated elements used to establish policy, strategy and objectives and to achieve those objectives through the implementation of plans.

NOTE 2 A management system includes organizational structure, roles and responsibilities, planning activities, standards, information systems, practices, processes, procedures and resources.

3.11 asset portfolio

complete range of **assets** and **asset systems** owned by an **organization**

NOTE Assets and asset systems may be highly integrated and interdependent or deliver more independent and parallel contributions to an organization's total performance. In the latter case, opportunities may exist to manage and optimize assets or asset systems differently across the portfolio.

3.12 asset system

set of **assets** that interact and/or are interrelated so as to deliver a required business function or service

NOTE For levels of assets, asset systems and asset portfolio, see **Figure 3**.

3.13 audit

systematic, independent process for obtaining evidence and evaluating it objectively to determine the extent to which audit criteria are fulfilled

[Adapted from BS EN ISO 9000:2005, 3.9.1]

3.14 contracted service provider

individual(s) not directly employed by the **organization** including contractors, subcontractors, service providers, consultants, agency staff and casual workers

3.15 corrective action

action to eliminate the cause of a detected **nonconformity** or other undesirable situation

NOTE 1 There can be more than one cause for a nonconformity.

NOTE 2 Corrective action is taken to reinstate capability and/or prevent recurrence, whereas preventive action is taken to prevent occurrence in the first place.

[BS EN ISO 9000:2005, 3.6.5]

3.16 critical assets/asset systems

assets and/or **asset systems** that are identified as having the greatest potential to impact on the achievement of the **organizational strategic plan**

NOTE The assets can be safety-critical, environment-critical and/or performance-critical, and can relate to legal, regulatory and/or statutory requirements.

3.17 effectiveness

extent to which planned activities are realized and planned results achieved

[BS EN ISO 9000:2005, 3.2.14]

3.18 efficiency

relationship between the result achieved and the resources used

[BS EN ISO 9000:2005, 3.2.15]

3.19 enablers (asset management)

supportive systems, procedures, processes, activities and resources that enable an **organization** to operate its **asset management system** efficiently and effectively

3.20 functional policy

specified approach, rules and boundaries set out by an organization, that provide direction and the framework for the control of specific asset-related processes and activities

NOTE Functional policies, strategies and objectives relate to asset management activities or processes, such as capital investment, construction methods, maintenance and purchasing. These should not be confused with **asset management policies**, **asset management strategy** and **asset management objectives**, which are cross-functional, considering the life cycle optimization of all relevant activities.

3.21 life cycle

time interval that commences with the identification of the need for an **asset** and terminates with the decommissioning of the asset or any associated liabilities

NOTE The principal stages of an asset's life cycle can include: create/acquire, utilize, maintain and renew/dispose.

3.22 nonconformity

non-fulfilment of a requirement

[BS EN ISO 9000:2005, 3.6.2; BS OHSAS 18001:2007, 3.11]

NOTE A nonconformity can be any deviation from: asset management system requirements; relevant work standards, practices, procedures, legal requirements, etc.

3.23 optimize

achieve by a quantitative or qualitative method, as appropriate, the best value compromise between conflicting factors such as performance, costs and retained risk within any non-negotiable constraints

3.24 organization

company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration

NOTE For organizations with more than one operating business unit, a single operating unit may be defined as an organization.

[BS EN ISO 14001:2004, 3.16]

3.25 organizational strategic plan

overall long-term plan for the organization that is derived from, and embodies, its vision, mission, values, business policies, stakeholder requirements, objectives and the management of its risks

NOTE Some organizations call this Corporate Plan, Corporate Strategic Plan or Business Plan.

3.26 preventive action

action to eliminate the cause of a potential nonconformity or other undesirable potential situation

NOTE 1 There can be more than one cause for a potential nonconformity.

NOTE 2 Preventive action is taken to prevent occurrence whereas corrective action is taken to prevent recurrence.

[BS EN ISO 9000:2005, 3.6.4]

3.27 procedure

specified way of carrying out an activity or a process

NOTE 1 Procedure(s) can be documented or not.

NOTE 2 If a procedure is required to be documented, the term "documented procedure" is used in this specification. Where this term appears within this specification, this means that the procedure is established, documented, implemented and maintained.

[Adapted from BS EN ISO 9000:2005, 3.4.5]

3.28 process

set of interrelated or interacting activities which transforms inputs into outputs

NOTE Processes may be classified in a number of different ways. A distinction is sometimes made between operational processes which are directly concerned with the planned outputs of the organization, and management processes which provide the framework that enables the operational processes to take place.

[PAS 99:2006, 3.8]

3.29 record

document stating results achieved or providing evidence of activities performed

NOTE 1 Records can be used, for example, to provide evidence of calibration, audit, incident investigation, results of stakeholder consultation, preventive action or corrective action.

NOTE 2 Generally records need not be under revision control.

[BS EN ISO 9000:2005, 3.7.6]



3.30 risk management

coordinated activities to direct and control an **organization** with regard to risk

[PD ISO/IEC Guide 73:2002, 3.1.7]

3.31 stakeholder

person or group having an interest in the **organization's** performance, success or the impact of its activities

NOTE 1 Examples include employees, customers, shareholders, financiers, regulators, statutory bodies, contractors, suppliers, unions, or society.

NOTE 2 A group can comprise an organization, a part thereof, or more than one organization.

3.32 sustainable

achieving or retaining an optimum compromise between performance, costs and risks over the **asset's life cycle**, whilst avoiding adverse long-term impacts to the **organization** from short-term decisions

NOTE The related noun "sustainability" relates to the quality of being sustainable.

3.33 sustainable development

enduring, balanced approach to economic activity, environmental responsibility and social progress

[BS 8900:2006, 0.1]

NOTE See 3.32 for the distinction between "sustainable development" and "sustainable".

3.34 top management

appointed and authorized person, or a group of people, who direct and control an **organization** at the highest level

NOTE 1 The top management (e.g. in a large organization, the board or executive committee) are not necessarily the owners of the organization they direct and control.

NOTE 2 The top management may delegate some of their duties to one or more subordinate management representative(s) while still retaining accountability.



4 Asset management system requirements

4.1 General requirements

The organization shall establish, document, implement, maintain and continually improve an asset management system in accordance with the requirements of this PAS.

The organization shall define and document the scope of its asset management system.

Where an organization chooses to outsource any aspect of asset management that affects conformity to the requirements of **Clause 4** of this PAS, the organization shall ensure control over such aspects in accordance with the requirements of **4.4.2**.

NOTE This PAS requires that organizations establish, implement and maintain an asset management policy, strategy, objectives and plans. **Figure 5** illustrates the relationship between the organizational strategic plan and these elements of the asset management system.

4.2 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 appropriate to the nature and scale of the organization's assets and operations;
- c) be consistent with other organizational policies;
- d) be consistent with the organization's overall risk management framework;
- e) provide the framework which enables the asset management strategy, objectives and plans to be produced and implemented;
- f) include a commitment to comply with current applicable legislation, regulatory and statutory requirements and with other requirements to which the organization subscribes;



- g) clearly state the principles to be applied, such as the organization's approach to health and safety or sustainable development;
- h) include a commitment to continual improvement in asset management and asset management performance;
- i) be documented, implemented and maintained;
- j) be communicated to all relevant stakeholders, including contracted service providers, where there is a requirement that these persons are made aware of their asset management policy-related obligations;
- k) 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 should provide sufficient information and direction to drive the asset management system (parts of which may be confidential) and have a summarized (non-confidential) version for dissemination to its stakeholders.

NOTE 2 Organizations may also have one or more functional policies relating to specific asset management activities, such as capital investment, operation, maintenance or contracting. It is essential, however, that alignment is maintained between such functional policies and the overall asset management policy.

4.3 Asset management strategy, objectives and plans

4.3.1 Asset management strategy

The organization shall establish, document, implement and maintain a long-term asset management strategy which shall be authorized by top management.

NOTE The time horizon for a long-term asset management strategy would normally be aligned with that of the organizational strategic plan.

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 policies and strategies;
- c) identify and consider the requirements of relevant stakeholders;
- d) consider the life cycle management requirements of the assets;
- e) take account of asset-related risks (see 4.4.7), asset and asset system criticalities;



- f) identify the function(s), performance and condition of existing asset systems and critical assets;
- g) state the desired future function(s), performance and condition of existing and new asset systems and critical assets, on timescales aligned to those of the organizational strategic plan;
- h) clearly state the approach and principal methods by which assets and asset systems will be managed;

NOTE This may include, for example, the criteria to be adopted for determining asset criticality and value, the life cycle and sustainability basis for asset management planning, the approach to asset risk and reliability management and the methods of optimization and decision-making.
- i) provide sufficient information, direction and guidance to enable specific asset management objectives and asset management plan(s) to be produced;
- j) include criteria for optimizing and prioritizing asset management objectives and plans;
- k) be communicated to all relevant stakeholders, including contracted service providers, where there is a requirement that these persons are made aware of their asset management strategy-related obligations;
- l) be reviewed periodically to ensure that it remains effective and consistent with the asset management policy and organizational strategic plan and with other organizational policies and strategies.

4.3.2 Asset management objectives

The organization shall establish and maintain asset management objectives, which shall:

- a) be measurable (i.e. quantified and/or capable of being demonstrated as achieved through objective assessment);
- b) be derived from, and consistent with, the asset management strategy;
- c) be consistent with the organization's commitment to continual improvement;
- d) be communicated to all relevant stakeholders, including contracted service providers, where there is a requirement that these persons are made aware of their obligations;
- e) be reviewed and updated periodically by the organization to ensure that they remain relevant and consistent with the asset management strategy;
- f) consider legal, regulatory, statutory and other asset management requirements;
- g) take account of the expectations of relevant stakeholders and financial, operational and business requirements;
- h) take account of asset management related risks;
- i) consider improvement opportunities including new technologies and asset management tools, techniques and practices (see 4.6.5.2).

NOTE Objectives may be set for the asset management system, asset management activities and/or the performance or condition of asset systems or assets.

4.3.3 Asset management plan(s)

The organization shall establish, document and maintain asset management plan(s) to achieve the asset management strategy and deliver the asset management objectives across the following life cycle activities:

- a) creation, acquisition or enhancement of assets;
- b) utilization of assets;
- c) maintenance of assets;
- d) decommissioning and/or disposal of assets.

NOTE 1 Creation, acquisition or enhancement includes design, modification, procurement, construction and commissioning.

NOTE 2 Maintenance also includes inspection, condition monitoring, functional testing, repair, refurbishment, and/or life extension of assets. Replacement of individual assets may also be considered as maintenance of asset systems.

NOTE 3 Asset management plan(s) can be for individual assets, asset types, asset systems, whole asset portfolios and/or the overall asset management system. However, it is essential that the plans are clearly linked to the asset

management strategy and objectives that they are intended to achieve.

The development of asset management plan(s) and life cycle activities shall include consideration of the impact of actions in one life cycle phase upon the activities necessary in other life cycle phases.

The asset management plan(s) shall be optimized and the actions prioritized. Multiple plans (for example, covering a portfolio of asset systems or assets) shall be jointly optimized and prioritized, taking into account overall value, resource requirements, interdependencies, risks and performance impact.

NOTE Developing, optimizing, prioritizing and integrating asset management plan(s) are iterative processes that start with the development or update of the asset management strategy.

The asset management plan(s) shall include documentation of:

- a) the specific tasks and activities (actions) required to optimize costs, risks and performance of the assets and/or asset system(s);
- b) the designated responsibilities and authorities for the implementation of such actions and for the achievement of asset management objectives;
- c) the means and time scales by which these actions are to be achieved.

The asset management plan(s) shall be communicated to all relevant stakeholders to the level of detail appropriate to their participation or business interests in the delivery of the plan(s).

In the development of asset management plan(s), the organization shall ensure that appropriate arrangements, functional policies, standards, process(es) and/or procedure(s), asset management enablers and resources are made available for the efficient and cost effective implementation of the plan(s).

NOTE It is essential that the plan(s) are realistic and can be implemented.

The asset management plan(s) shall include actions to improve the asset management system (see 4.6.5 and 4.7).

The asset management plan(s) shall be reviewed periodically by the organization to ensure that they remain effective and consistent with the asset management strategy and objectives.

4.3.4 Contingency planning

The organization shall establish, implement, and maintain plan(s) and/or procedure(s) for identifying and responding to incidents and emergency situations, and maintaining the continuity of critical asset management activities.

In developing its plan(s) and procedure(s), the organization shall consider:

- a) asset-related risks that, if realized, could result in incidents or emergency situations;
- b) potential disruptions to its critical asset management activities;
- c) the most appropriate actions for responding to an incident or emergency situation, and mitigating the likely consequences;
- d) the competence and training of personnel required to respond to emergencies;
- e) the needs of relevant stakeholders who may be affected by incidents or emergency situations, or who may be required to support the organization to respond to such events.

The plan(s) and/or procedure(s) shall identify how the organization will respond to, and manage, incidents

and emergency situations, and shall include information on:

- 1) essential personnel, emergency services and external agencies, including contact details;
- 2) arrangements for internal and external communication;
- 3) how the organization will maintain or restore its critical asset management activities in the event of a disruption;
- 4) the provision of resources, and the maintenance of any equipment, facilities or services that could be required during disruptions, incidents or emergency situations;
- 5) recording of essential information whilst responding to, and managing, incidents and emergencies;
- 6) the process for returning to normal operations.

The organization shall periodically review, test and, where deemed necessary, revise its plan(s) and/or procedure(s) for incident and emergency preparedness and response and continuity of important asset management activities.

NOTE *It is essential that the organization's contingency plans are reviewed after testing or the occurrence of incidents, emergency situations or disruptions.*



4.4 Asset management enablers and controls

4.4.1 Structure, authority and responsibilities

The organization shall establish and maintain an organizational structure of roles, responsibilities and authorities, consistent with the achievement of its asset management policy, strategy, objectives and plans.

These roles, responsibilities and authorities shall be defined, documented and communicated to the relevant individuals.

NOTE *There is no need to establish a separate organizational structure provided the organization's structure is consistent with achieving the requirements set out in Clause 4.*

Top management shall provide evidence of its commitment to the development and implementation of the asset management system and the continuous improvement of its effectiveness by:

- a) appointing a member of top management who, irrespective of other responsibilities, shall be responsible for the overall design, maintenance, documentation, review and improvement of the organization's asset management system;
- b) appointing member(s) of management whose responsibility is to ensure that the assets and assets systems deliver the requirements of the asset management policy, strategy, objectives and plans and who have the authority to achieve this;
- c) identifying and monitoring the requirements and expectations of the organization's stakeholders and taking corresponding and timely action, to the extent that these have implications for the organization's management of its assets;
- d) ensuring that the asset management policy and strategy are consistent with the organizational strategic plan;
- e) considering the adverse impact that the asset management policy, asset management strategy, asset management objectives and asset management plan(s) might have on other aspects of the organization. Conversely, considering whether plans generated from other parts of the organization might have an adverse affect on asset management;
- f) ensuring the viability of the asset management policy, asset management strategy, asset management objectives and asset management plan(s);
- g) ensuring asset-related risks are identified, assessed and controlled, and are included in the organization's overall risk management framework;

- h) ensuring the availability of sufficient resources;
- i) communicating to all relevant stakeholders the importance of complying with the requirements of the asset management system in order to achieve its organizational strategic plan.

4.4.2 Outsourcing of asset management activities

Where an organization chooses to outsource any aspect of asset management that affects conformity with the requirements of Clause 4, the organization shall ensure control over such aspects. The organization shall determine and document how these parts will be controlled and integrated into the organizations' asset management system. The organization shall also identify and document:

- a) the processes and activities that are to be outsourced (including the scope and boundaries of the outsourced processes and activities and their interfaces with the organization's own processes and activities);
- b) the processes and scope for the sharing of knowledge and information between the organization and the contracted service provider(s);
- c) authorities and responsibilities within the organization for managing the outsourced processes and activities.

4.4.3 Training, awareness and competence

The organization shall ensure that any person(s) under its direct control undertaking asset management related activities has an appropriate level of competence in terms of education, training or experience.

NOTE *Levels of appropriate asset management competence can be ascertained through the use of a competency requirements framework (see Bibliography for examples of relevant competency requirements frameworks).*



Where asset management activities are outsourced, the organization shall ensure that contracted service providers have arrangements in place to ascertain and demonstrate that their staff are competent.

The organization shall develop plans for the human resources required to develop and implement its asset management system. The organization shall identify the competency requirements for these human resources and plan the training necessary for them to achieve these competencies. It shall arrange for provision of this training and retain associated records.

The organization shall establish, implement and maintain process(es) and/or procedure(s) to make persons working under its control aware of:

- a) the asset management related risks associated with their work activities and the asset management benefits of personal performance;
- b) their roles and responsibilities and the importance in complying with the asset management policy, process(es) and/or procedure(s) and plan(s);
- c) the potential consequences of departure from specified asset management process(es) and/or procedure(s).

4.4.4 Communication, participation and consultation

The organization shall ensure that pertinent asset management information is effectively communicated to and from employees and other stakeholders, including contracted service providers.

The organization shall ensure consultation with stakeholders that is relevant and appropriate to their involvement in:

- a) the development of the asset management strategy, objectives and plan(s);
- b) the development of functional policies, engineering standards, process(es) and/or procedure(s);
- c) risk assessments and determination of controls;
- d) incident investigation;
- e) the continual improvement of the asset management system.

4.4.5 Asset management system documentation

The organization shall establish, implement and maintain up-to-date documentation to ensure that its asset management system can be adequately understood, communicated and operated. The asset management system documentation shall include:



- a) a description of the main elements of the asset management system and their interaction, and direction to related documents;
- b) the asset management policy, strategy, and objectives;
- c) documents, including records, required by **Clause 4** of this specification.

The organization shall establish documented procedure(s) and/or operating criteria if their absence could lead to failure to achieve its asset management policy, asset management strategy, asset management objectives or to control identified asset management risks.

NOTE 1 *The asset management policy, strategy and other elements of the asset management system do not have to be produced as separate documents.*

NOTE 2 *It is important that documentation is proportional to the level of complexity and risks being managed. It should also be appropriate to the level at which the documentation will be used and kept to the minimum required for effectiveness and efficiency.*

4.4.6 Information management

The organization shall identify the asset management information it requires to meet the requirements of **Clause 4** of this specification considering all phases of the asset life cycle. The information shall be of a quality appropriate to the asset management decisions and activities it supports.

The organization shall design, implement and maintain a system(s) for managing asset management information. Employees and other stakeholders, including contracted service providers, shall have access to the information relevant to their asset management activities or responsibilities. Where separate asset management information systems exist, the organization shall ensure that the information provided by these systems is consistent.

The organization shall establish, implement and maintain procedure(s) for controlling all information required by **Clause 4** of this specification. These procedures shall ensure:



- a) the adequacy of the information is approved by authorized personnel prior to use;
- b) information is maintained and adequacy assured through periodic review and revision, including version control where appropriate;
- c) allocation of appropriate roles, responsibilities and authorities regarding the origination, generation, capture, maintenance, assurance, transmission, rights of access, retention, archiving and disposal of items of information;
- d) obsolete information is promptly removed from all points of issue and points of use, or otherwise assured against unintended use;
- e) archival information retained for legal or knowledge preservation purposes is identified;
- f) information is secure and, if in electronic form, is backed up and can be recovered.

4.4.7 Risk management

4.4.7.1 Risk management process(es)

The organization shall establish, implement and maintain documented process(es) and/or procedure(s) for the ongoing identification and assessment of asset-related and asset management-related risks, and the identification and implementation of necessary control measures throughout the life cycles of the assets.

4.4.7.2 Risk management methodology

The organization's methodology for risk management shall:

- a) be proportionate to the level of risk under consideration;
- b) be defined with respect to its scope, nature and timing to ensure it is proactive rather than reactive;
- c) include, where appropriate, the assessment of how risks change or can change over time and usage;

- d) provide for the classification of risks and identification of those risks that are to be avoided, eliminated or controlled by asset management objectives and plans (see 4.3.2 and 4.3.3);
- e) be consistent with the organization's operating experience and the capabilities of risk control measures employed;
- f) provide for the monitoring of required actions to ensure both the effectiveness and the timeliness of their implementation (see 4.6.1).

4.4.7.3 Risk identification and assessment

The identification and assessment of risks shall consider the probability of credible events and their consequences, and shall as a minimum cover:

- a) physical failure risks, such as functional failure, incidental damage, malicious damage or terrorist action;
- b) operational risks, including the control of the asset, human factors and all other activities which affect its performance, condition or safety;
- c) natural environmental events (storm, floods, etc., including the likely effects of climate change);
- d) factors outside of the organization's control, such as failures in externally supplied materials and services;
- e) stakeholder risks, such as failure to meet regulatory performance requirements or risks to the reputation of the organization;
- f) risks associated with the different life cycle phases of assets (see 4.5).

4.4.7.4 Use and maintenance of asset risk information

The organization shall ensure that the results of risk assessments and the effects of risk control measures are considered and, as appropriate, provide input into:

- a) the asset management strategy;



- b) the asset management objectives;
- c) the asset management plan(s);
- d) the identification of adequate resources including staffing levels;
- e) the identification of training and competency needs (see 4.4.3);
- f) the determination of controls for assets' life cycle activities, and the implementation of asset management plan(s) (see 4.5);
- g) the organization's overall risk management framework.

The organization shall keep the results of identification of risks, risk assessments and determined controls up-to-date, and document these where not doing so could affect the delivery of the asset management objectives and the asset management strategy.

4.4.8 Legal and other requirements

The organization shall establish, implement and maintain process(es) and/or procedure(s) for identifying and accessing the legal, regulatory, statutory and other applicable asset management requirements.

The organization shall ensure that the applicable legal and other external obligations or requirements are identified and incorporated into the corresponding elements of its asset management system.

The organization shall keep this information up-to-date. The organization shall communicate information on legal and other requirements to all relevant stakeholders.

4.4.9 Management of change

Where existing arrangements are revised, or new arrangements are introduced that could have an impact on asset management activities, the organization shall assess the associated risks before the arrangements are implemented. The new or revised arrangements to be considered shall include:

- a) revised organizational structure, roles or responsibilities;
- b) revised asset management policy, strategy, objectives or plans;
- c) revised process(es) or procedure(s) for asset management activities;
- d) the introduction of new assets, asset systems or technology;
- e) the introduction of new contractors or suppliers.

The organization shall ensure that risks are managed in accordance with 4.4.7.

4.5 Implementation of asset management plan(s)

4.5.1 Life cycle activities

The organization shall establish, implement and maintain process(es) and/or procedure(s) for the implementation of its asset management plan(s) and control of activities across the whole life cycle, including:

- a) creation, acquisition or enhancement of assets;
- b) utilization of assets;
- c) maintenance of assets;
- d) decommissioning and/or disposal of assets.

The requirement for documentation to control these asset life cycle activities shall be in accordance with 4.4.5.

The process(es) and/or procedure(s) for the implementation of the asset management plan(s) and for the control of life cycle activities shall:

- 1) be sufficient to ensure that operations and activities are carried out under specified conditions;
- 2) be consistent with the asset management policy, asset management strategy and asset management objectives;
- 3) ensure that costs, risks and asset system performance are controlled across the asset life cycle phases.

The organization shall ensure that the planned arrangements, functional policies, standards, process(es) and procedure(s), asset management enablers and resources are utilized for the efficient and cost effective implementation of the asset management plan(s).

4.5.2 Tools, facilities and equipment

The organization shall ensure that tools, facilities and equipment are maintained and, where appropriate, calibrated. The organization shall establish and maintain process(es) and procedure(s) to control these maintenance and calibration activities, where such tools, facilities and equipment are essential for:

- a) the implementation of its asset management plan(s);
- b) achieving the required function(s) and performance from its assets or asset systems;
- c) the monitoring and measurement of performance and/or condition.



4.6 Performance assessment and improvement

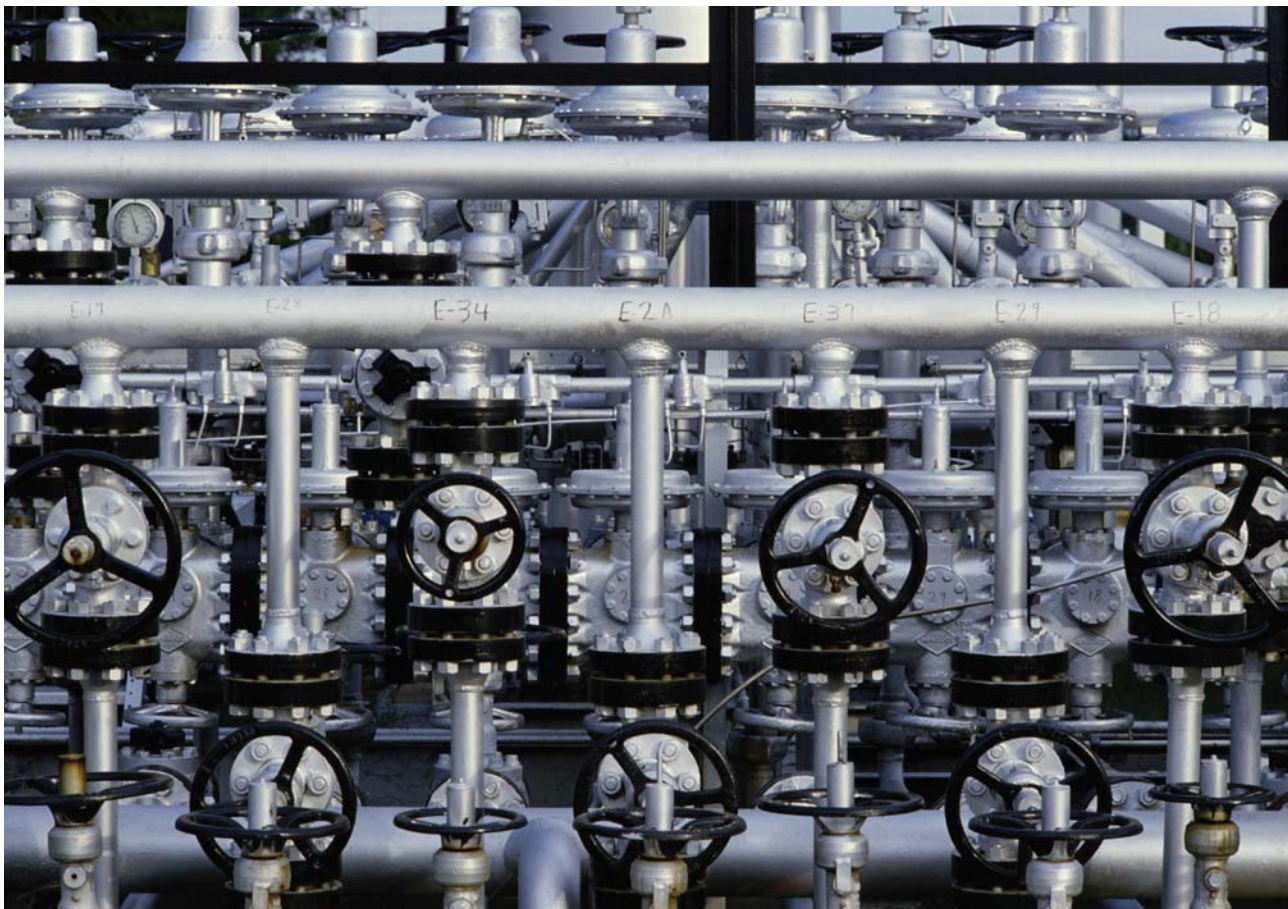
4.6.1 Performance and condition monitoring

The organization shall establish, implement and maintain process(es) and/or procedure(s) to monitor and measure the performance of the asset management system and the performance and/or condition of assets and/or asset systems. The process(es) and/or procedure(s) shall provide for the consideration of:

- a) reactive monitoring to identify past or existing nonconformities in the asset management system, and any asset-related deterioration, failures or incidents;
- b) proactive monitoring to seek assurance that the asset management system and assets and/or asset systems are operating as intended. This shall include monitoring to ascertain that the asset management policy, strategy and objectives are met, the asset management plan(s) are implemented, and that the process(es), procedure(s) or other arrangements to control asset life cycle activities are effective;
- c) leading performance indicators to provide warning of potential non-compliance with the performance requirements of the asset management system and/or the assets and/or asset systems;

- d) lagging performance indicators to enable detection of, and to provide data about, incidents and failures of the asset management system, and for incidents, failures or deficient performance of assets and/or asset systems;
- e) both qualitative and quantitative measures, appropriate to the needs of the organization;
- f) monitoring the overall effectiveness and efficiency of the asset management system;
- g) recording of monitoring and measurement data and results to facilitate subsequent analysis of problem causes to assist in determining corrective or preventive actions and/or to facilitate continual improvement (in accordance with 4.6.5).

When setting the frequency of condition or performance monitoring and the parameters for measurement the organization shall consider, at a minimum, the costs of monitoring, the risks of failure or nonconformity, and potential deterioration mechanisms and deterioration rates.



4.6.2 Investigation of asset-related failures, incidents and nonconformities

The organization shall establish, implement and maintain process(es) and/or procedure(s) for the handling and investigation of failures, incidents and nonconformities associated with assets, asset systems and the asset management system. These process(es) and/or procedure(s) shall define responsibility and authority for:

- a) taking action to mitigate consequences arising from a failure, incident or nonconformity;
- b) investigating failures, incidents and nonconformities to determine their root cause(s);
- c) evaluating the need for preventive action(s) to avoid failures, incidents and nonconformities occurring;
- d) communicating, as appropriate to relevant stakeholders, the results of investigations and identified corrective action(s) and/or preventive action(s).

Investigations shall be performed within a timescale commensurate with the actual and/or potential consequences of the failure, incident or nonconformity.

4.6.3 Evaluation of compliance

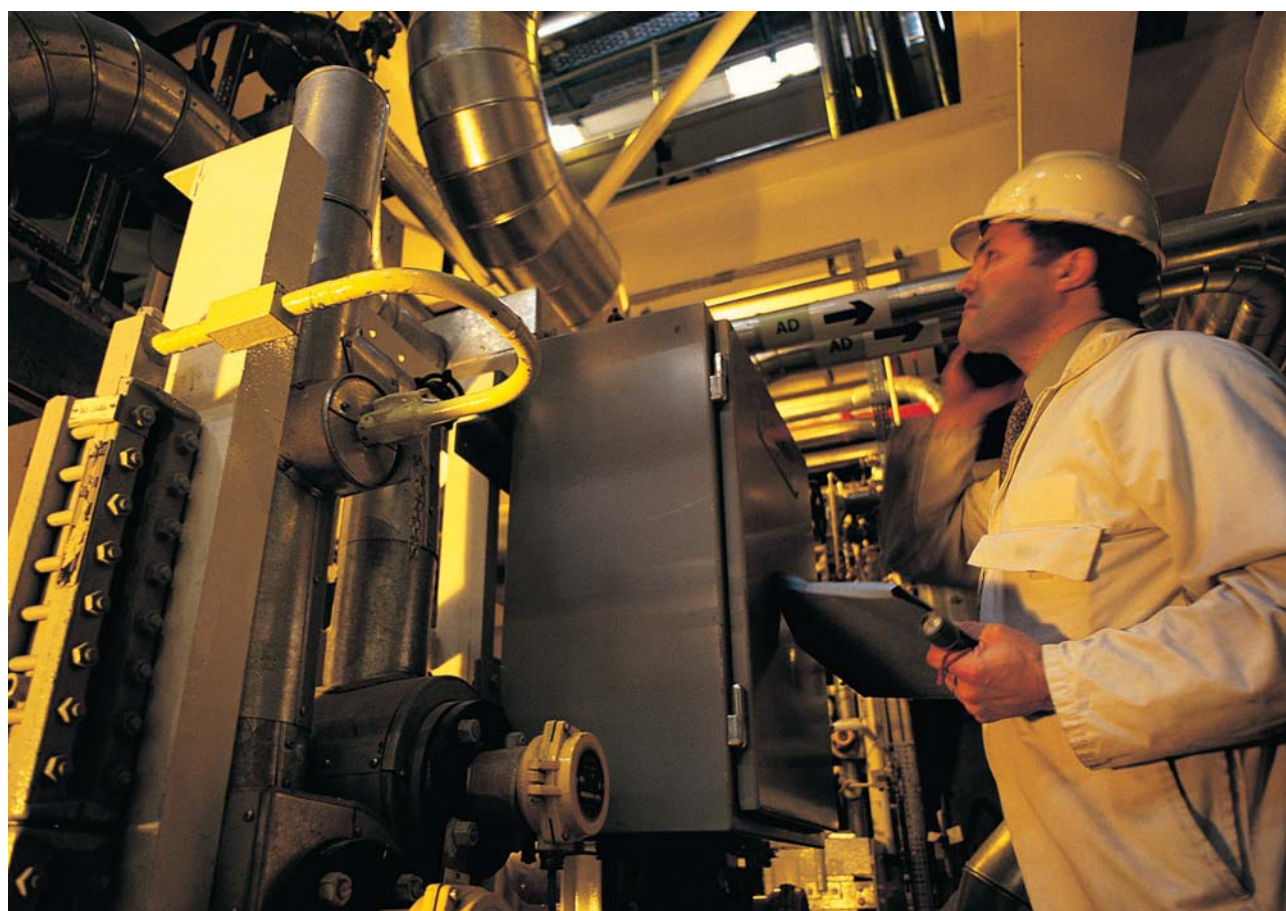
The organization shall establish, implement and maintain process(es) and/or procedure(s) for evaluation of its compliance with applicable legal and other regulatory or absolute requirements, and shall determine the frequency of such evaluations.

The organization shall keep records of the results of these evaluations.

4.6.4 Audit

The organization shall ensure that audits of the asset management system are conducted to:

- a) determine whether the asset management system:
 - i) conforms to planned arrangements for asset management, including the requirements of **Clause 4**;
 - ii) has been implemented and is maintained;
 - iii) is effective in meeting the organization's asset management policy, asset management strategy and asset management objectives.
- b) provide information to management.



Audit programme(s) for elements of the asset management system shall be planned, established, implemented and maintained by the organization, based on the results of risk assessments of the organization's activities, and the results of previous audits.

Audit process(es) and/or procedure(s) shall be established, implemented and maintained to address:

- 1) the responsibilities, competencies and requirements for planning and conducting audits, reporting results and retaining associated records;
- 2) the determination of audit criteria, scope and methods that are commensurate with the business significance and risks being managed.

The selection of auditors and the conduct of audits shall ensure objectivity and the impartiality of the audit process. Audits shall be conducted by personnel independent of those having direct responsibility for the activity being examined.

NOTE 1 The term "independent" here does not necessarily mean external to the organization.

NOTE 2 It is recommended that the selection of auditors considers their level of understanding of good practice in asset management and familiarity with the requirements of **Clause 4** of this PAS.

4.6.5 Improvement actions

4.6.5.1 Corrective and preventive action

The organization shall establish, implement and maintain process(es) and/or procedure(s) for instigating:

- a) corrective action(s) for eliminating the causes of observed poor performance and nonconformities identified from investigations, evaluations of compliance and audits to avoid their recurrence;
- b) preventive action(s) for eliminating the potential causes of nonconformities or poor performance.

Any corrective or preventive actions taken and their timings shall be commensurate with the risk(s) encountered.

Where a corrective or preventive action identifies new or changed risks, or the need for new or changed process(es), procedure(s) or other arrangements to control asset life cycle activities, the proposed actions shall be risk assessed prior to implementation (see **4.4.7**).

The organization shall keep records of the corrective and preventive actions (see **4.6.6**) taken and communicate these to relevant stakeholders.

The organization shall ensure that any necessary changes arising from corrective and/or preventive actions are made to the asset management system.

4.6.5.2 Continual improvement

The organization shall establish, implement and maintain process(es) and/or procedure(s) for identifying opportunities and assessing, prioritizing and implementing actions to achieve continual improvement in:

- a) the optimal combination of costs, asset related risks and the performance and condition of assets and asset systems across the whole life cycle;
- b) the performance of the asset management system.

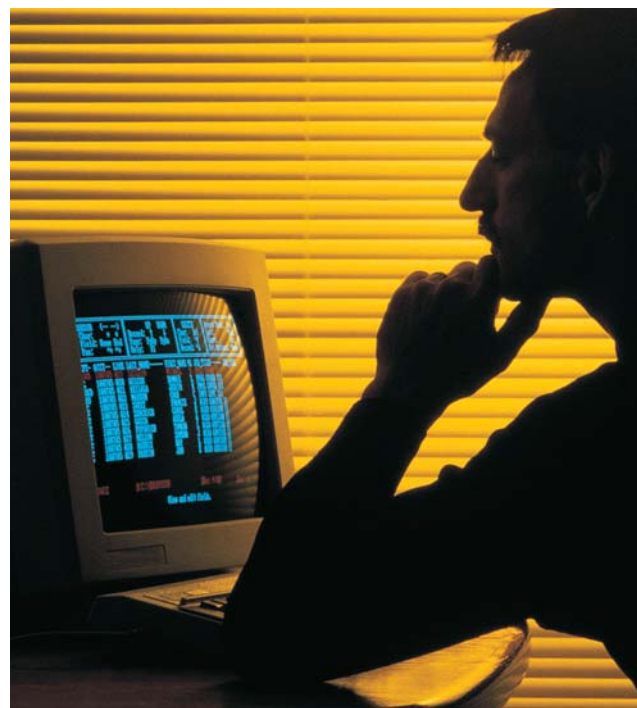
The organization shall actively seek and acquire knowledge about new asset management-related technology and practices, including new tools and techniques, and these shall be evaluated to establish their potential benefit to the organization.

4.6.6 Records

The organization shall establish and maintain records as necessary to demonstrate conformance to the requirements of its asset management system and **Clause 4** of this PAS.

Records shall be legible, identifiable and traceable.

Records shall be maintained in accordance with the requirements of **4.4.6**.



4.7 Management review

Top management shall review at intervals that it determines appropriate the organization's asset management system to ensure its continuing suitability, adequacy and effectiveness. Reviews shall include assessing the need for changes to the asset management system, including asset management policy, asset management strategy and asset management objectives.

Input to management reviews shall include:

- a) results of internal audits and evaluations of compliance with applicable legal requirements and with other requirements to which the organization subscribes;
- b) the results of communication, participation and consultation with employees and other stakeholders (see 4.4.4);
- c) relevant communication(s) from external stakeholders, including complaints;
- d) records or reports on the asset management performance of the organization;
- e) the extent to which objectives have been met;
- f) performance in addressing incident investigations, corrective actions and preventive actions;
- g) follow-up actions from previous management reviews;

- h) changing circumstances, including developments in legal and other requirements related to asset management and changes in technology.

The management review shall also cover aspects of the asset management system, if any, that are outsourced to a contracted service provider.

The outputs from management reviews, consistent with the organization's commitment to continual improvement, shall include decisions and actions for possible changes to:

- 1) asset management policy, strategy and objectives;
- 2) asset management performance requirements;
- 3) resources;
- 4) other elements of the asset management system.

Outputs from management reviews, which are relevant to the organizational strategic plan, shall be made available to top management for consideration in reviews of the organizational strategic plan.

Records of management reviews shall be retained and information relevant to specific employees, contracted service providers or other stakeholders made available for communication purposes (see 4.4.4).



Annex A (informative)

Correspondence between PAS 55-1:2008, BS OHSAS 18001:2007, BS EN ISO 14001:2004 and BS EN ISO 9001:2000

PAS 55:2008	OHSAS 18001:2007	ISO 14001:2004	ISO 9001:2000
0 Introduction	0 Introduction	0 Introduction	0 Introduction
1 Scope	1 Scope	1 Scope	1 Scope
2 Normative references	2 Normative references	2 Normative references	2 Normative references
3 Terms and definitions	3 Terms and definitions	3 Terms and definitions	3 Terms and definitions
4 Asset management system requirements (title only)	4 OH&S management system elements (title only)	4 Environmental management system requirements (title only)	4 Quality management system (title only)
4.1 General requirements	4.1 General requirements	4.1 General requirements	4.1 General requirements
4.2 Asset management policy	4.2 OH&S policy	4.2 Environmental policy	5.1 Management commitment 5.3 Quality policy
4.3 Asset management strategy, objectives and plans (title only)	4.3 Planning (title only)	4.3 Planning (title only)	5.4 Planning (title only)
4.3.1 Asset management strategy	–	–	–
4.3.2 Asset management objectives	4.3.3 Objectives and programme(s)	4.3.3 Objectives, targets and programme(s)	5.4.1 Quality objectives
4.3.3 Asset management plan(s)	4.3.3 Objectives and programme(s)	4.3.3 Objectives, targets and programme(s)	5.4.2 Quality management system planning 7.1 Planning of product realization
4.3.4 Contingency planning	4.4.7 Emergency preparedness and response	4.4.7 Emergency preparedness and response	–
4.4 Asset management enablers and controls	–	–	–
4.4.1 Structure, authority and responsibilities	4.4.1 Resources, roles, responsibility, accountability and authority	4.4.1 Resources, roles, responsibility and authority	5.1 Management commitment 6.1 Provision of resources 6.3 Infrastructure
4.4.2 Outsourcing of asset management activities	–	–	–
4.4.3 Training, awareness and competence	4.4.2 Competence, training and awareness	4.4.2 Competence, training and awareness	6.2.1 (Human resources) General 6.2.2 Competence, awareness and training
4.4.4 Communication, participation and consultation	4.4.3 Communication, participation and consultation	4.4.3 Communication	5.5.3 Internal communication 7.2.3 Customer communication
4.4.5 Asset management system documentation	4.4.4 Documentation 4.4.5 Control of documents	4.4.4 Documentation 4.4.5 Control of documents	4.2.1 (Documentation requirements) General 4.2.3 Control of documents

PAS 55:2008	OHSAS 18001:2007	ISO 14001:2004	ISO 9001:2000
4.4.6 Information management	4.4.5 Control of documents	4.4.5 Control of documents	4.2.3 Control of documents
4.4.7 Risk management	4.3.1 Hazard identification, risk assessment and determining controls	4.3.1 Environmental aspects	–
4.4.7.1 Risk management process(es)			
4.4.7.2 Risk management methodology			
4.4.7.3 Risk identification and assessment			
4.4.7.4 Use and maintenance of asset risk information			
4.4.8 Legal and other requirements	4.3.2 Legal and other requirements	4.3.2 Legal and other requirements	5.2 Customer focus
			7.2.1 Determination of requirements related to the product
4.4.9 Management of change	4.3.1 Hazard identification, risk assessment and determining controls	4.3.1 Environmental aspects	5.2 Customer focus
			7.2.2 Review of requirements related to the product
			8.5.1 Continual improvement
4.5 Implementation of asset management plan(s) (title only)	4.4 Implementation and operation (title only)	4.4 Implementation and operation (title only)	7 Product realization (title only)
4.5.1 Life cycle activities	4.4.6 Operational control	4.4.6 Operational control	7.1 Planning of product realization
			7.2 Customer-related processes
			7.3 Design and development
			7.4 Purchasing
			7.5 Production and service provision
4.5.2 Tools, facilities and equipment	–	–	7.6 Control of monitoring and measuring devices
4.6 Performance assessment and improvement (title only)	4.5 Checking (title only)	4.5 Checking (title only)	8 Measurement, analysis and improvement (title only)
4.6.1 Performance and condition monitoring	4.5.1 Performance measurement and monitoring	4.5.1 Monitoring and measurement	8.1 General
			8.2.3 Monitoring and measurement of processes
			8.2.4 Monitoring and measurement of product
			8.4 Analysis of data
4.6.2 Investigation of asset-related failures, incidents and non-conformances	4.5.3 Incident investigation, nonconformity, corrective action and preventive action (title only)	–	8.3 Control of nonconforming product
	4.5.3.1 Incident investigation	–	–

PAS 55:2008	OHSAS 18001:2007	ISO 14001:2004	ISO 9001:2000
4.6.3 Evaluation of compliance	4.5.2 Evaluation of compliance	4.5.2 Evaluation of compliance	8.2.3 Monitoring and measurement of processes
			8.2.4 Monitoring and measurement of product
4.6.4 Audit	4.5.5 Internal audit	4.5.5 Internal audit	8.2.2 Internal audit
4.6.5 Improvement actions	4.5.3.2 Nonconformity, corrective and preventive action	4.5.3 Nonconformity, action and action	8.3 Control of nonconforming product
4.6.5.1 Corrective and preventive action			8.4 Analysis of data
4.6.5.2 Continual improvement			8.5.2 Corrective action
			8.5.3 Preventive action
4.6.6 Records	4.5.4 Control of records	4.5.4 Control of records	4.2.4 Control of records
4.7 Management review	4.6 Management review	4.6 Management review	5.1 Management commitment
			5.6 Management review (title only)
			5.6.1 General
			5.6.2 Review input
			5.6.3 Review output
			8.5.1 Continual improvement

Bibliography

Standards publications

PAS 99:2006, *Specification of common management system requirements as a framework for integration*

BS 8900:2006, *Guidance for managing sustainable development*

BS EN ISO 9000:2005, *Quality management systems – Fundamentals and vocabulary*

BS EN ISO 9001:2000, *Quality management systems – Requirement*

BS EN ISO 14001:2004, *Environmental management systems – Specification with guidance for use*

BS OHSAS 18001:2007, *Occupational health and safety management systems – Requirements*

ISO Guide 72:2001, *Guidelines for the justification and development of management system standards*

PD ISO/IEC Guide 73:2002, *Risk management – Vocabulary – Guidelines for use in standards*

Further reading

BS 3811:1993, *Glossary of terms used in terotechnology*

BS 3843-1:1992, *Guide to terotechnology (the economic management of assets) – Part 1: Introduction to terotechnology*

BS 3843-2:1992, *Guide to terotechnology (the economic management of assets) – Part 2: Introduction to the techniques and applications*

BS 3843-3:1992, *Guide to terotechnology (the economic management of assets) – Part 3: Guide to the available techniques*

BS 25999-1:2006, *Business continuity management – Part 1: Code of practice*

BS 25999-2:2007, *Business continuity management – Part 2: Specification*

BS EN ISO 9004:2000, *Quality management systems – Guidelines for performance improvement*

ISO/IEC 15288:2002, *Systems engineering – System life cycle processes*

OHSAS 18002:2000, *Occupational health and safety management systems – Guidelines for the implementation of OHSAS 18001*

Other publications

Asset Management Competence Requirements Framework (Version 2.0) and User Guidance Notes, Institute of Asset Management, London 2008

International Infrastructure Management Manual, Version 3.0 2006. ISBN 0-473-10685-X. Produced by the Association of Local Government Engineering New Zealand Inc. and the Institute of Public Works Engineering of Australia (IPWEA)

National Occupational Standards for Management and Leadership, Management Standards Council, 2002-04

Project Management Body of Knowledge Guide, 3rd Edition, Project Management Institute, 2004

Successful Health and Safety Management. Sudbury: HSE Books, 1997 (HSG65)

UK Standard for Professional Engineering Competence, Engineering Council, 2005



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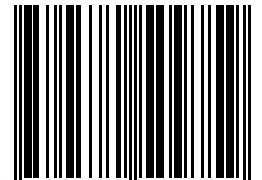
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