

The Asset Management Landscape

Second Edition

English Version



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Global Forum
On Maintenance & Asset Management

The Global Forum on Maintenance and Asset Management

The Global Forum on Maintenance and Asset Management (GFMAM) has been established with the aim of sharing collaboratively advancements, knowledge and standards in maintenance and asset management.

The members of GFMAM (at the time of issue of this document) are:

- Asset Management Council (AMCouncil), Australia;
- Associação Brasileira de Manutenção e Gestão de Ativos (ABRAMAN), Brazil;
- European Federation of National Maintenance Societies (EFNMS), Europe;
- French Institut of Asset Management and Infrastructures (IFRAMI), France;
- Gulf Society of Maintenance Professionals (GSMP), Arabian Gulf Region;
- Iberoamerican Federation on Maintenance (FIM), South America;
- Institute of Asset Management (IAM), UK
- Plant Engineering and Maintenance Association of Canada (PEMAC), Canada
- The Society for Maintenance and Reliability Professionals (SMRP), USA.
- The Southern African Asset Management Association (SAAMA), South Africa

The enduring objectives of the GFMAM are:

- 1) To bring together, promote and strengthen the maintenance and asset management community worldwide
- 2) To support the establishment and development of associations or institutions whose aims are maintenance and asset management focused
- 3) To facilitate the exchange and alignment of maintenance and asset management knowledge and practices
- 4) To raise the credibility of member organizations by raising the profile of the Global Forum

This document describes the **Asset Management Landscape Second Edition, English Version** that supports the third of these enduring objectives.

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1 Background

There have been major global advances in Asset Management standards, models and principles over the last two decades. The Global Forum on Maintenance and Asset Management determined that there is benefit in aligning these various advances and collaborating to develop a collective view, in particular for organizations that operate asset management systems in many countries.

The first edition of the **GFMAM Asset Management Landscape** (Landscape) was published by the GFMAM in November 2011¹ to achieve this ambition. At the time of publication of the first edition, it was agreed that the Landscape would be reviewed in 2014 against the publication of ISO 5500x, and would incorporate developments in our understanding of asset management. Feedback on the first edition of the Landscape also showed that it was being used far more widely than initially envisaged. As well, the subject descriptions were considered to be at too high a level for developing the requirements for the GFMAM projects such as ISO 55001 Auditor/Assessor competencies.

A detailed review was carried out by GFMAM members during 2013, and brief details of the review criteria and process are given Appendix B: Landscape Review.

This document contains the GFMAM Asset Management Landscape, Second Edition, English Version including the subjects and fundamentals that depict the discipline of asset management.

Each GFMAM member incorporates this Landscape as part of their asset management framework. An asset management framework shows how and where a member's 'knowledge and practices' fit within the Asset Management Landscape.

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¹ ISBN 978-0-9871799-1-3

2 Purpose of the Landscape, Second Edition

The Asset Management Landscape is a GFMAM initiative focused on the third of GFMAM's enduring objectives *'to facilitate the exchange and alignment of maintenance and asset management knowledge and practices'*.

The various purposes for the GFMAM Asset Management Landscape, Second Edition are:

- To provide an overview of the discipline of asset management;
- To provide the structure for building a body of knowledge for certification schemes and qualifications in asset management;
- To provide a means of comparing and contrasting different certification schemes and qualifications;
- To provide the structure (and potentially the criteria) for assessing an organization's maturity in asset management;
- To inform the asset management knowledge requirements for ISO 55000 assessors; and
- To compare the products and services from the different GFMAM members through cross referencing to the 39 Subjects.

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3 Overview of the Landscape

The Asset Management Landscape is a framework to enable asset management knowledge and practices to be compared, contrasted and aligned around a common understanding of the discipline of asset management. The Asset Management Landscape is represented in diagram 1 below:

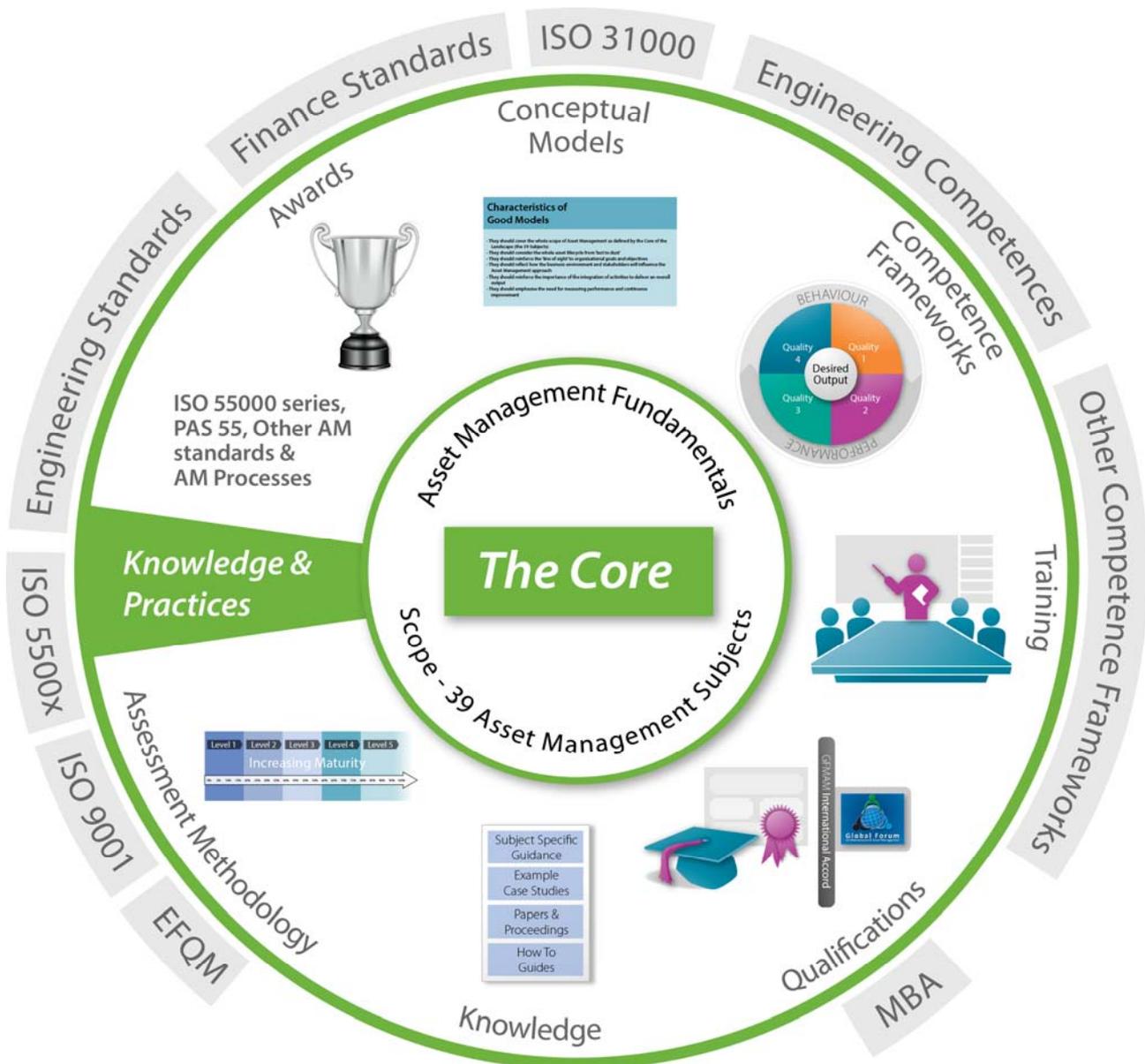


Diagram 1: Asset Management Landscape

This shows that the Asset Management Landscape is made up of three key areas:

- 1) The **core** of the Asset Management Landscape which will be common across all GFMAM members;
- 2) The **knowledge and practices area** of the Asset Management Landscape which will contain the knowledge and practices of each member society within their own asset management frameworks.

- 3) The **supporting area** which contains reference to standards and other knowledge and practices that are considered to be outside the scope of asset management but which may influence the asset management practices of organizations around the world.

3.1 The Core

The **Core** of the Landscape comprises the asset management **fundamentals** and the asset management **subjects**.

The asset management **fundamentals** are part of the **core** to ensure GFMAM member organizations have a common understanding of Asset Management; even though they use different models and techniques to describe this to suit their various member communities. These **fundamentals** are taken from the international standard on asset management, and are outlined in Section 5

The asset management **subjects** are part of the **core** to enable GFMAM members to be able to compare, contrast and align their knowledge and practices. These **subjects** are also intended to provide a common understanding of the scope of asset management. The list of **subjects** has been derived from an international review of an extensive list of asset management models and assessment methodologies. This review identified 39 asset management **subjects** that together describe the scope of asset management. The list of **subjects** is shown in Section 6, GFMAM Asset Management Landscape Subjects, Second Edition. Mapping of these subjects to the first edition (GFMAM Landscape (ISBN 978-0-9871799-1-3, issued November 2011) is shown in Appendix C: GFMAM Asset Management Landscape Subjects First and Second Edition.

It is essential to note that this is an arbitrary division of the discipline into individual subjects for the purpose of understanding the breadth and components of asset management more clearly. They cannot be treated as self-standing and independent and it is not possible to understand asset management properly without addressing them all as a holistic integrated body of knowledge.

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3.2 The Knowledge and Practices Area

The **knowledge and practices area** of the Asset Management Landscape represents the knowledge and practices that GFMAM member organizations have developed or may wish to develop. It is intended that each GFMAM member organization will develop their own asset management framework that is aligned with the **core** of the Asset Management Landscape but is also aligned to the knowledge and practice of each member organization. The components that make up of these frameworks will be different across the different member organizations but are likely to include the items shown in the **knowledge and practices area** of diagram 1. A brief description of these generic components is provided in Section 4 of this document.

These asset management frameworks will allow member organizations to map their knowledge and practices to the asset management **fundamentals** and **subjects** and enable these to be compared, contrasted and aligned with the knowledge and practices of other member organizations. It also allows member organizations to do a gap analysis of what they offer to their members.

The development of these asset management frameworks should provide the following benefits to the members of the GFMAM member societies:

- Greater access to guidance and best practice material on asset management;
- Common definitions relating to asset management and how maintenance contributes to asset management;
- Help to bring maintenance and asset management to the boardroom;
- Greater consistency internationally on guidance on asset management;
- Greater choice of internationally recognised qualifications through the international Accord;
- Increased availability of international case studies and other knowledge.

3.3 The Supporting Area

The **supporting area** of the Asset Management Landscape contains standards, knowledge and practices that are not considered to be within the scope of asset management but that may influence asset management decisions. Only a few examples are shown on diagram 1 and this should not be considered to be a comprehensive list.

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4 Components of the Knowledge and Practices Area

The following sections provide an overview of the different components of the **knowledge and practices area** of the Asset Management Landscape.

4.1 Conceptual Models

A conceptual model describes, at the highest level: the key aspects of asset management, how these interact with each other and how they link to the overall corporate objectives and business plan.

Everyone's journey in the understanding and application of asset management is different, reflecting differing starting points, cultures, languages and objectives. Thus, differing conceptual models may be helpful to present asset management in way that reflects more closely the background and current position of any member organization, whilst still retaining a common approach and content.

However, there are a number of common characteristics that a conceptual model should include, which are:

- They should cover the whole scope of asset management as defined by the 39 **subjects** of the Landscape;
- They should be consistent with GFMAM asset management **fundamentals**;
- They should consider the whole asset lifecycle;
- They should reinforce alignment ('line of sight') to organizational goals and objectives;
- They should reflect how the business environment and stakeholders will influence the asset management approach;
- They should reinforce the importance of integration of activities to deliver an overall output;
- They should emphasise the need for measuring performance and continuous improvement.

Three example conceptual models from GFMAM member organizations are in shown in Appendix A that all share these characteristics.

4.2 Competence Frameworks

A competence framework contains the competence requirements that are needed for people working at different levels within an asset management organization. Competence requirements are typically described in a hierarchy, for example *Roles*, *Units* and *Elements* of competence. Competence frameworks sometimes define the *level* of competence required for different asset management roles or otherwise will define the process by which these should be defined within an organization looking to adopt the competence framework.

Competence frameworks are typically linked to an asset management body of knowledge and should be linked with the 39 **subjects** within the Asset Management Landscape core to demonstrate coverage of scope.

4.3 Asset Management Training Courses

Asset management training courses can be described within an asset management framework by linking this training to the 39 **subjects** to demonstrate coverage of scope of each course. The training courses can also be linked to the *units* and *elements* of competence defined within the competence frameworks.

4.4 Asset Management Qualifications

Asset management qualifications will typically form part of an asset management framework whether these qualifications are offered by the GFMAM member organizations or by third parties. Another GFMAM project (the International Accord) will provide the framework for assessing the *relevance* and *level* of different asset management qualifications from providers around the world. The assessment of qualifications will be undertaken using the asset management qualifications Framework, which is fully mapped to the 39 **subjects** in the Asset Management Landscape **core**.

It is expected that asset management qualifications included within a GFMAM asset management framework will have been assessed using the International Accord. This will be particularly beneficial to multi-national organizations that are members of more than one GFMAM member organization and are seeking a common approach to asset management qualifications globally.

4.5 Knowledge

Most GFMAM member organizations already have a body of knowledge, knowledge base, knowledge centre or other initiatives to collate and disseminate knowledge, but the ability to compare, contrast, align and share information across member organizations is limited due to the different approaches used to develop these. Mapping the member organizations' knowledge to the 39 **subjects** in the Asset Management Landscape **core** will facilitate the sharing of case studies, papers, how-to guides and best practices, thereby rapidly increasing the volume of material available to end users.

4.6 Assessment Methods and Awards

As organizations adopt asset management, some will rapidly want to develop their capabilities beyond simple conformance with the requirements of ISO 55001. It will be important for GFMAM member organizations to provide guidance to these organizations on a consistent way of assessing asset management maturity across the 39 **subjects** in the Asset Management Landscape **core**.

GFMAM member organizations may have developed their own assessment methods that may also be used for asset management awards, and there will be an increasing need to ensure these assessment methods are aligned with the 39 **subjects** and are consistent across GFMAM member organizations.

5 Asset Management Fundamentals

Although definitions of asset and asset management are not part of the asset management landscape **core**, the following definitions are included to provide the context for the asset management **fundamentals** that follow. They are taken from the International Standard ISO 55000, *Asset management - Overview, principles and terminology*.

An **asset** is defined in ISO 55000 as ‘*item, thing or entity that has potential or actual value to an organization*’.

Asset management is defined in ISO 55000 as ‘*coordinated activity of an organization to realise value from assets*’.

This is a much broader view, and a more challenging scope, than just the maintenance of physical equipment, or the maximising of yield from a financial portfolio. It encompasses **all asset types**, tangible and intangible, individual components or complex systems, and **all activities** involved in the asset’s **life cycle** – everything from initial identification of requirements or opportunities, acquisition/creation, operations or utilization activities, asset stewardship or care/maintenance responsibilities, through to renewal or disposal and any remaining liabilities. Asset management is therefore holistic – it considers the whole picture rather than just individual contributions.

The fundamentals of asset management, that need to be understood and embedded into asset management to ensure that value is realised from assets, are:

Value: Assets exist to provide value to the organization and its stakeholders.

Asset management does not focus on the asset itself, but on the value that the asset can provide to the organization. The value (which can be tangible or intangible, financial or non-financial) will be determined by the organization and its stakeholders, in accordance with the organizational objectives.

Alignment: Asset management translates the organizational objectives into technical and financial decisions, plans and activities.

Asset management decisions (technical, financial and operational) collectively enable the achievement of the organizational objectives.

Leadership: Leadership and workplace culture are determinants of realisation of value.

Leadership and commitment from all managerial levels is essential for successfully establishing, operating and improving asset management within the organization.

Assurance: Asset management gives assurance that assets will fulfil their required purpose.

The need for assurance arises from the need to effectively govern an organization. Assurance applies to assets, asset management and the asset management system.

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6 GFMAM Asset Management Landscape Subjects, Second Edition

The Asset Management Landscape subjects are given in the list below. Information about how these subjects map to the First Edition of the Landscape is in Section 9.

Landscape Subject Group	Landscape Second Edition Subject
Strategy & Planning	Asset Management Policy
	Asset Management Strategy & Objectives
	Demand Analysis
	Strategic Planning
	Asset Management Planning
Asset Management Decision-Making	Capital Investment Decision-Making
	Operations & Maintenance Decision-Making
	Lifecycle Value Realisation
	Resourcing Strategy
	Shutdowns & Outage Strategy
Lifecycle Delivery	Technical Standards & Legislation
	Asset Creation & Acquisition
	Systems Engineering
	Configuration Management
	Maintenance Delivery
	Reliability Engineering
	Asset Operations
	Resource Management
	Shutdown & Outage Management
	Fault & Incident Response
	Asset Decommissioning and Disposal
Asset Information	Asset Information Strategy
	Asset Information Standards
	Asset Information Systems
	Data & Information Management
Organisation & People	Procurement & Supply Chain Management
	Asset Management Leadership
	Organizational Structure
	Organizational Culture
	Competence Management
Risk & Review	Risk Assessment and Management
	Contingency Planning & Resilience Analysis
	Sustainable Development
	Management of Change
	Assets Performance & Health Monitoring
	Asset Management System Monitoring
	Management Review, Audit & Assurance
	Asset Costing & Valuation
	Stakeholder Engagement

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Asset Management Policy

Definition:

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

Context:

The Asset Management Policy provides a set of principles and a framework for the development and implementation of an organization's approach to asset management (sometimes implemented within an asset management system). The Asset Management Policy should also provide the principles that guide the development of the organization's asset management strategy and objectives.

The Asset Management Policy should be consistent with stakeholder requirements and organizational objectives and constraints. It should also be aligned with and consistent with other organizational policies.

The Asset Management Policy should be supported by top management, effectively communicated and regularly reviewed with a commitment to continual improvement of the asset management system.

Artefacts:

Typical artefacts within this Subject include:

- Asset Management Policy

Related Subjects:

- Asset Management Strategy

Relevant Standards:

- Clause 5.2 of ISO 55001

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Asset Management Strategy

Definition:

The strategic plan for the management of the assets of an organization that will be used to achieve the organizational / corporate objectives.

Context:

The Asset Management Strategy describes the long-term approach to management of the physical assets. It would typically include a set of strategic statements that describe the current and future service levels the organization is planning to deliver and the current and future Asset Management capabilities that the organization needs in order to sustainably deliver these outcomes.

The Asset Management Strategy would typically include:

- Asset management objectives based upon scenario analyses that includes measurable objectives on the expected economic, environmental and social performance of an organization's asset portfolio.
- Key accountabilities for both the activities covered by the Asset Management Strategy and for the implementation and ongoing maintenance of the Asset Management Strategy.
- The decision-making criteria that are used to undertake lifecycle cost and risk analysis to determine the optimum asset interventions,
- How the organization will develop its asset information to support such analysis and how the organization will manage uncertainty associated with its asset information
- A reference to the overall Asset Management System that describes the management system that the organization has implemented / is implementing including a description of how the Asset Management Strategy fits into the AM management system.
- The methodology for determining asset and network criticality.

Artefacts:

Typical artefacts within this Subject include:

- Asset Management Strategy
- Asset Management Objectives
- Strategic Asset Management Plan (SAMP)

Related Subjects:

- Asset Management Policy
- Stakeholder Engagement
- Demand Analysis
- Strategic Planning

Relevant Standards:

- Clause 4.4 of ISO 55001
- Clause 6.2.1 of ISO 55001

Demand Analysis

Definition:

The processes an organization uses to both assess and influence the demand for, and level of service from, an organization's assets.

Context:

Demand analysis typically includes the analysis of future demand for the product or services being offered and the requirements this demand will place on the asset portfolio.

There are several elements of Demand Analysis that need to be considered:

- Historic demand
- Drivers for demand
- Future demand and change in demand over time
- Changes in required levels of service
- Current and future utilisation and capability of assets
- Impact on the future performance, condition and capability

Demand analysis also considers the use of non-asset solutions where demand may exceed supply and demand also needs to be managed in order to reduce the demand or reduce the required level of service.

Artefacts:

Typical artefacts within this Subject include:

- Demand Forecasts
- Historical Demand Analysis
- Demand Scenarios
- Demand Management Strategy
- Service Level Specifications

Related Subjects:

- Asset Management Strategy
- Strategic Planning

Relevant Standards:

- Clause 4.2 of ISO 55001

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Strategic Planning

Definition:

The processes an organization uses to undertake strategic asset management planning.

Context:

Strategic planning includes the processes for determining long-term renewal, enhancement and maintenance work volumes, associated risks and costs to meet the asset management objectives. This includes assessing how the organization addresses the requirements identified during demand analysis and how the Strategic Asset Management Plan supports the overall organizational corporate plan.

Strategic planning would typically involve the development of a strategic planning framework that describes how Demand Analysis and the required levels of service are considered and modelled in the development of the organization's proposed maintenance, renewal and enhancement work volumes.

The strategic planning processes should enable organizations to develop work volumes and costs for different scenarios to reflect potential changes in risk, demand, output requirements or funding constraints from different stakeholders.

Artefacts:

Typical artefacts within this Subject include:

- Strategic Asset Management Plan (SAMP)
- Work volumes and costs

Related Subjects:

- Asset Management Strategy
- Stakeholder Engagement
- Demand Analysis
- Asset Management Planning

Relevant Standards:

- Clause 4.4 of ISO 55001

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Asset Management Planning

Definition:

The activities to develop the Asset Management plans that specify the detailed activities and resources, responsibilities and timescales and risks for the achievement of the asset management objectives.

Context:

Strategic Planning addresses the strategic planning activities undertaken within an organization. Asset Management Planning is the process of developing the detailed Asset Management Plans that include the following:

- A review of previous Asset Management Plan(s) with recovery plans where applicable
- The activities that an organization intends to undertake in order to deliver the Asset Management objectives and level of service
- The costs associated with delivering these activities
- The outcomes expected from the application of these activities
- The resources necessary to execute asset management plans
- Integration of Asset Management Plans with other organizational plans e.g. financial plans, health and safety plans and human resource plans)
- The activities necessary to deliver activities to statutory, regulatory, industry and technical standards where applicable
- How the plan will be approved monitored, reviewed and updated

Artefacts:

Typical artefacts within this Subject include:

- Asset Management Plans
- Work volumes and costs
- Resource plans

Related Subjects:

- Strategic Planning
- Resource Strategy
- Shutdown & Outage Strategy

Relevant Standards:

- Clause 6.2.2 of ISO 55001

Capital Investment Decision-Making

Definition:

The processes and decisions to evaluate and analyse scenarios for decisions related to capital investments of an organization. These processes and decisions may relate to new assets for the organization (e.g. Greenfield projects) and/or replacements of assets at end of life (CAPEX sustaining programs).

Context:

Capital Investment Decision-Making includes an evaluation approach of alternative investments with a vision of long-term benefits (asset life-cycle perspective). This approach includes steps of definition, characterization, evaluation and analysis that drive the best options to decision-making managers.

Capital Investment Decision-Making would typically include:

- Defining the scope of the investments that are subject to analysis of alternatives;
- The assumptions for each investment option including the demands and level of service required;
- The consideration of the information that need to be collected or estimated for each option;
- The consideration of all lifecycle costs;
- The consideration of risk, how this changes over time and how this is valued and evaluated;
- Undertaking life-cycle cost analysis to allow the comparison of alternative options from the perspective of the asset life-cycle; and
- Analysis of the present value and annualized costs and risks for each of the options being considered.

Artefacts:

Typical artefacts within this Subject include:

- Prioritising process for Capital Investments
- Life-Cycle Costing algorithms

Related Subjects:

- Asset Management Strategy
- Demand Analysis
- Strategic Planning
- Operations & Maintenance Decision-Making
- Lifecycle Value Realisation

Relevant Standards:

- ISO 15686 - Buildings and constructed assets – Service life planning

Operations & Maintenance Decision-Making

Definition:

The management activities and processes involved in determining the Operations and Maintenance requirements in support of the Asset Management objectives and goals.

Context:

Operations & Maintenance Decision-Making is the determination of the Operations and Maintenance activities necessary to meet the Asset Management objectives, taking into account organizational and applicable regulatory policies.

The Operations & Maintenance Decision-Making decision process typically consider:

- Customer quality requirements (product and service)
- Current asset capability (throughput, product / service flexibility, quality)
- Use of FMECA / RCM or similar techniques to determine maintenance activities
- The organization's agreed cost – risk balance to determine activity intervals including consideration of asset and network criticality
- Forecasting medium and long term (3+ years) production / service requirements based upon projected demand
- Perform financial analysis of production tactics (production cost structure defined by assets and their operations)
- Documentation of maintenance requirements in specifications and standards
- Evaluate O&M impact of capital project proposal alternates (life cycle costing, long and short term impact).

Artefacts:

Typical artefacts within this Subject include:

- Asset capability requirements;
- Maintenance Requirements Analysis documents;
- Maintenance standard and specifications;

Related Subjects:

- Capital Investment Decision-Making
- Accounting Practices
- Maintenance Delivery
- Asset Operations

Relevant Standards:

- Clause 6.1 of ISO 55001

Lifecycle Value Realisation

Definition:

The activities undertaken by an organization to balance the costs and benefits of different renewal, maintenance, overhaul and disposal interventions.

Context:

Lifecycle Value Realisation refers to the methods used, to ensuring the best total value is obtained, in asset acquisition, creation, utilization, maintenance, improvements, renewals and disposals to meet the organizations objectives. This requires consideration of the interaction between these activities, and determination of the right combination, including costs, risks, performance and sustainability effects. Value relates to the contribution to the organizational objectives and may be manifested in various ways, and are not always easy to quantify. However the maximum total value often equates to the lowest whole life cycle cost of the asset, within any absolute constraints or commitments.

Lifecycle Value Realisation would typically include:

- Evaluation processes and criteria for their usage including the level of detail required in relation to decision criticality and decision complexity;
- A multi-disciplined approach and the quantification of value, direct and indirect intervention costs, risks, performance, operating and maintenance costs;
- Consideration of the systems context for the asset, since the life cycle of an individual item may be constrained by, or may contribute to, a different timescale of required performance or asset management responsibility;
- System modelling to determine whether the lifecycle value solution will deliver the required demands and levels of service expected by stakeholders.

Artefacts:

Typical artefacts within this Subject include:

- Methodologies for determining value
- Criteria for decision-making
- Lifecycle Value Analysis processes and application criteria

Related Subjects:

- Asset Management Strategy
- Demand Analysis
- Strategic Planning
- Capital Investment Decision-making
- Operations & Maintenance Decision-making

Relevant Standards:

- Clause 6.1 of ISO 55001
- Clause 6.2 of ISO 55001

Resourcing Strategy

Definition:

Determining the activities and processes to be undertaken by an organization in order to procure and use people, plant, tools and materials to deliver the Asset Management Objectives and Asset Management Plan(s).

Context:

A Resourcing Strategy typically includes the analysis necessary to determine the best way to establish or procure the required resources to deliver the Asset Management objectives and the activities defined in the Asset Management Plan(s). These resources include:

- Competent Labour;
- Spares;
- Plant and equipment;
- Special tools and equipment;
- Hardware and software.

The Resourcing Strategy should consider the costs and risks of out-sourcing the provision of resources and how to best integrate the available resources across the organization in order to cost effectively deliver the Asset Management Plan(s).

Where resources are being procured externally to the organization, the Resourcing Strategy should include an assessment of the costs and risks relating to the timing and quantities of the resources to be procured, including any internal storage or management costs.

Artefacts:

Typical artefacts within this Subject include:

- Resource Strategy
- Procurement plans for the purchase of resources
- Spares management strategy.
- Resourced project plans

Related Subjects:

- Asset Management Planning
- Resource Management

Relevant Standards:

- Clause 7.1 of ISO 55001

Shutdown and Outage Strategy

Definition:

The activities taken by an organization to develop a strategy for shutdown and outages.

Context:

Shutdown and Outage Strategy includes the procedures and requirements to enable organizations to reduce downtime and outages whilst considering the cost to carry out the activities defined in the Asset Management Plan efficiently and safely during planned outages.

The Shutdown and Outage Strategy would typically include:

- Shutdown or Outage objectives that are agreed by all the parties involved, including operations, maintenance, engineering, projects, central production planning, contractors or service providers among others.
- Analysis of the trade-off between the efficiencies of fewer but longer shutdowns or outages (that have a higher impact on the business production) against more but shorter shutdowns or outages (that have less impact on the business but result in less efficient delivery of work).
- Preliminary scope requirements defining the scope of work to be undertaken with well understood risks and consequences identified and agreed upon by all parties involved.
- A final scope and package including the final shutdown scope, schedule (including shutting down and starting up the asset or facility required time), the scope of work, materials required, manpower, contractors and other resources required.
- Scope challenge exercises to ensure the strategy is robust.

Artefacts:

Typical artefacts within this Subject include:

- Shutdown & outage strategy
- Shutdown and outage procedure and packaging requirements.
- A long-term planned outages schedule.
- Level of authorities in the organization for every stage of the shutdown or outage.

Related Subjects:

- Asset Management Planning
- Contract & Supplier Management
- Shutdown & Outage Management

Relevant Standards:

- None

Technical Standards & Legislation

Definition:

The processes used by an organization to ensure its asset management activities are compliant with the relevant technical standards and legislation.

Context:

Technical Standards and Legislation includes processes for the identification, applicability updating and compliance assurance of standards and legislation in the Asset Management context.

Artefacts:

- Register of applicable technical standards and legislation

Related Subjects:

- Asset Management Policy
- Asset Management Strategy
- Strategic Planning
- Asset Management Planning

Relevant Standards:

- None identified

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Asset Creation & Acquisition

Definition:

An organization's processes for the acquisition, installation and commissioning of assets.

Context:

Asset Creation & Acquisition describes policies and processes for the acquisition, installation and commissioning of assets. This subject also includes elements of approval and releasing of funding, arrangements for hand-over to operations, the monitoring and capture of actual costs and benefits analysis. The development of requirements analysis, design and verification and validation strategies are covered in Systems Engineering.

The management activities within the scope of this subject are:

- Application of Investment Policies
- Application of Investment Processes
- Development of Construction Processes
- Execution of Construction Processes
- Project Management
- Development of Commissioning Processes
- Execution of Commissioning Processes
- Handback to Operations

Artefacts:

Typical artefacts within this subject include:

- Acquisition Strategy
- Acquisition Request
- Acquisition Agreement
- Acquisition Agreement Change Request
- Acquisition Communication Report
- Programme Management Framework
- Project Management Procedures
- Project Technical Management Plan
- Work Breakdown Structure
- Project Schedules
- Project Budgets
- Verification Report
- Traceability Mapping
- Validation Report
- Construction Progress Reports
- Acceptance Criteria Documents
- Delivery Acceptance Report

Related Subjects:

- Capital Investment Decision-making

Standards:

- Numerous Construction Codes Identified
- Numerous Specific Commissioning Codes Identified

Systems Engineering

Definition:

An interdisciplinary, collaborative approach to derive, evolve and verify a life cycle balanced system solution which satisfies customer expectations and meets public acceptability.

Context:

Systems Engineering describes policies and processes for the requirements analysis, design and evaluation of assets. Systems Engineering processes relate to managerial and technical activities. Verification and validation execution is considered as part of Asset Creation and Acquisition. The management activities within the scope of this subject are:

- Generation of Systems Engineering Policies
- Development of System Engineering Processes
- Execution of Systems Engineering Processes

Artefacts:

Typical artefacts within this subject include:

- Systems Engineering Management Plan
- System Description Documents
- System Requirements Documents
- System Engineering Performance Measures
- Traceability Mapping Documents
- System Analysis Plan
- System Analysis Report
- Documented Systems Engineering Processes
- Verification Strategy
- Validation Strategy
- Validation Processes

Related Subjects:

- Configuration Management

Standards:

- ISO/IEC 15288:2008 Systems and software engineering - System life cycle processes
- MIL-STD-499 Military Standard System Engineering Management.

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Configuration Management

Definition:

A management process for establishing and maintaining consistency of a product's physical and functional attributes with its design and operational information throughout its life.

Context:

Configuration Management describes policies and processes for the recording and monitoring of an asset's functional, physical and support status. Configuration Management is closely aligned with the principles and requirements of Systems Engineering. The management activities within the scope of this subject are:

- Generation of Configuration Management Policies
- Development of Configuration Management Processes
- Execution of Configuration Management Processes

Artefacts:

Typical artefacts within this subject include:

- Configuration Management Plan
- Configuration Management Strategy
- Configuration Management Records
- Configuration Baselines
- Configuration Baseline Agreements
- CM Change / Variance Requests
- Configuration Status Reports
- Configuration Evaluation Reports
- System Release Reports
- System Release Approvals

Related Subjects:

- Systems Engineering

Standards:

- AS/ISO 10007:2003 Quality Management Systems – Configuration Management
- EIA-649-A 2004 National Consensus Standard for Configuration Management
- MIL-STD 973 Configuration Management (Cancelled)

Asset Management
Global Forum on Maintenance

Maintenance Delivery

Definition:

The management of maintenance activities including both preventive and corrective maintenance management methodologies.

Context:

The organization of maintenance activities within an agreed policy including definition of maintenance specifications, standards and schedules, maintenance execution procedures, procedures for missed maintenance and the capture and utilisation of maintenance and inspection measurements and results.

These activities include:

- Identifying the resources needed to support maintenance assurance processes.
- Implementing the responsibilities and accountabilities for asset maintenance delivery and improvement as part of the asset management system processes.
- Day to day application of processes that integrate maintenance delivery processes with engineering, finance, HR, IT, operations etc.
- Authorisation of funding sufficient resources and support systems to support asset investment planning.

Artefacts:

Typical artefacts within this Subject include:

- Maintenance staffing requirements (quantity & skills/certification)
- Maintenance tools and relevant infrastructure requirements.
- Maintenance strategy and tactics.
- Maintenance information systems infrastructure.

Related Subjects:

- Operations & Maintenance Decision-Making
- Whole-life Cost & Value Optimisation
- Reliability Engineering
- Asset Operations

Standards:

- None identified.

Reliability Engineering

Definition:

The processes for ensuring that an item shall operate to a defined standard for a defined period of time in a defined environment.

Context:

Reliability Engineering typically includes the following elements:

- Day to day application of processes that integrate Reliability Engineering processes with engineering, finance, HR, IT, maintenance and operations;
- Identify the resources needed to support reliability assurance;
- Work within the responsibilities, authorities and accountabilities for asset reliability improvement;
- Specify and design the responsibilities, authorities and accountabilities (and supporting measures) for asset reliability improvement as part of the asset management system processes, including the asset management system itself;
- Application of proprietary or predetermined methodologies for analyses to support asset management decision making during asset conception stages;
- Implement the change management responsibilities, authorities and accountabilities of the asset management system related to reliability;
- Specify and design the change management responsibilities, authorities and accountabilities as part of the asset management system processes, including the asset management system itself;
- Implement the specified reliability engineering processes (as part of the asset management system), including the collation of information and data to support continual improvement;
- Specify and design the reliability engineering competencies (and supporting measures) as part of the asset management system processes; and
- Development and design of processes and plans to support RAMS Modelling.

Artefacts:

Typical artefacts within this Subject include:

- RAMS Modelling Output
- RCM Analysis Output
- Weibull Plots and Analysis
- Completed Root Cause Analyses

Related Subjects:

- Asset Management Strategy
- Capital Management Investment Strategy
- Whole life Cost and Value Optimization
- Asset Performance and Health Monitoring

Relevant Standards:

- None Identified

Asset Operation

Definition:

The processes used by an organization to operate its assets to achieve the business objectives.

Context:

Asset Operation is concerned with processes that provide instructions to Operators about how to operate the assets within the appropriate design, maintenance and operational parameters. This includes the development of an Asset Operations strategy and plans that outline the approach, activities and resources involved in managing and implementing operations.

Artefacts:

Typical artefacts within this Subject include:

- Criteria for the required processes
- Control of the processes in accordance with the criteria
- Documented information to the extent necessary to have confidence and evidence that the processes have been carried out as planned
- Treating and monitoring of operational risks

Related Subjects

- Asset Management Strategy
- Strategic Planning

Relevant Standards:

- None Identified

Asset Management Landscape
Global Forum on Maintenance

Resource Management

Definition:

Implementing the Resourcing Strategy to manage the use of funds, people, plant, tools and materials in delivering asset management activities.

Context:

Managing the resources required for the execution of each asset management activity, including:

- Finances;
- Competent Labour;
- Spares;
- Special tools and equipment;
- Hardware and software;
- Data and Information; and
- Training.

Integrating the resource utilisation across the organization and across all asset management activities.

Artefacts:

Typical artefacts within this Subject include:

- Organizational Structure
- Job specifications
- Materials Catalogue
- Inventory Records
- Training records
- Tools
- Performance appraisals

Related Subjects

- Resourcing Strategy
- Operations & Maintenance Decision-Making
- Configuration Management
- Maintenance Delivery
- Competence Management
- Procurement & Supply Chain Management

Relevant Standards:

- None Identified

Shutdown and Outage Management

Definition:

An organization's processes for identification, planning, scheduling, execution and control of work related to shutdowns or outages.

Context:

Shutdown and Outage Management describes policies and processes for the implementation of the shutdown and outage strategy to ensure the effective management of shutdowns and outages. This subject includes processes relating to the identification and filtering of shutdown work, planning and scheduling, work execution and control and the development of lessons learned.

The management activities within the scope of this subject include:

- Development of Shutdown Management Policies
- Development of Shutdown Management Processes
- Execution of Shutdown Management Processes
- Project Management

Artefacts:

Typical artefacts within this subject include:

- Shutdown Work List
- Work Packages
- Shutdown Management Procedures
- Shutdown Work Breakdown Structure
- Shutdown Schedules
- Shutdown Budgets
- Shutdown Progress Reports
- Acceptance Criteria Documents
- Post Completion Reports

Related Subjects:

- Operations & Maintenance Decision-Making
- Resourcing Strategy
- Shutdowns & Outage Strategy
- Maintenance Delivery
- Procurement & Supply Chain Management

Standards:

- None Identified

Asset Management
Global Forum on Maintenance

Fault and Incident Response

Definition:

Responding to failures and incidents in a systematic manner, including incident detection and identification, fault analysis, use of standard responses, temporary and permanent repairs as well as the taking over and handing back of sites.

Context:

Developing plans to respond to unplanned events and managing the resources required for the response to the events, including:

- Competent Labour;
- Spares;
- Special tools and equipment;
- Data and Information;
- Communications; and
- Escalation criteria.

This includes the Integration of the response plans across the organization and ensuring the cause of failure is effectively captured to allow subsequent analysis of failure data.

Artefacts:

Typical artefacts within this Subject include:

- Risk register
- Safety plan
- Standby roster
- Communication plan
- Response plans
- Operating procedures
- Emergency stores
- Tools and equipment
- Skilled staff

Related Subjects

- Contingency Planning & Resilience Analysis
- Risk Management

Relevant Standards:

- None Identified

Asset Decommissioning & Disposal

Definition:

The processes used by an organization to decommission and dispose of assets due to ageing or changes in performance and capacity requirements.

Context:

Asset Decommissioning & Disposal develops and applies processes to decommission and dispose of assets due to ageing or changes in performance and capacity requirements. This includes the integration of Asset Disposal Plans with other organizational planning activities (e.g. financial plans, human resource plans).

This decision process includes the consideration of costs and benefits of rationalisation using a whole life approach, the impact of asset rationalisation on other infrastructure and the processes for disposal of assets.

Factors to be taken into account in these processes include:

- Environmental Impact of disposal
- Land rehabilitation
- Residual value of assets
- Continued service delivery

Artefacts:

Typical artefacts within this Subject include:

- Environmental Impact Analysis
- Land Rehabilitation Plan
- Outage Management Plan
- Asset Disposal Plan
- Logistics Plan

Related Subjects:

- Shutdown and Outage Strategy
- Lifecycle Value Realisation
- Risk Assessment and Management
- Asset Information Management

Relevant Standards:

- Environmental
- Service level
- Legislation regarding asset disposal

Asset Information Strategy

Definition:

The strategic approach to the definition, collection, management, reporting and overall governance of asset information necessary to support the implementation of an organization's asset management strategy and objectives.

Context:

An Asset Information Strategy describes how asset information supports the delivery of the Asset Management Strategy and objectives and what Asset Information Systems and governance processes are necessary to deliver that asset information. An Asset Information Strategy would typically include:

- A policy on asset information;
- The identification of asset information needs to support the organization's decision-making and operational processes including data quality and accuracy requirements;
- Responsibilities and accountabilities for information management;
- Processes for continued alignment of these needs as the organization's requirements evolve;
- A gap analysis of current information availability against information needs, including consideration of data quality and accuracy requirements;
- An analysis of the costs and benefits of providing for these asset information needs, including consideration of data quality and accuracy requirements;
- The information system business requirements necessary to support the organization's business processes and information needs;
- Processes for the improvement of asset information and data quality;
- A description of the organization's asset information improvement programmes.

Artefacts:

Typical artefacts within this Subject include:

- Asset Information Policy
- Asset Information Strategy
- Asset Information Business Cases
- Asset Information System Business Requirements

Related Subjects:

- Asset Management Strategy
- Asset Information Standards
- Asset Information Systems
- Data & Information Management

Relevant Standards:

- Clause 7.5 of ISO 55001
- ISO 27000/1/2

Asset Information Standards

Definition:

The specification of a consistent structure and format for collecting and storing asset Information and for reporting on the quality and accuracy of asset information.

Context:

Asset Information Standards includes the development of standards and guidelines that ensure a consistent approach to the recording of asset information to meet the asset information needs defined in the Asset Information Strategy. This includes defining common methods for recording the following:

- The asset hierarchy;
- Attributes of assets that are required and the acceptable values for these;
- The geographical position of assets;
- Condition grades;
- Categorising and recording asset defects;
- Categorising and recording causes of asset failure;
- Categorising and recording consequences of asset failure;
- Utilisation of assets.

Asset Information Management also includes defining the required quality and accuracy for all asset information, including common methods for how quality and accuracy is defined and assessed.

Artefacts:

Typical artefacts within this Subject include:

- Asset Information Standards and Guidelines
- Asset Data Dictionary
- Data Quality Definitions And Guidelines

Related Subjects:

- Asset Information Strategy
- Asset Information Systems
- Data & Information Management

Relevant Standards:

- Clause 7.5 of ISO 55001
- ISO 27000/1/2

Asset Information Systems

Definition:

The asset information systems an organization has in place to support the asset management activities and decision-making processes in accordance with the Asset Information Strategy.

Context:

Asset Information Systems includes the provision, operation and maintenance of all Asset Information Systems necessary to deliver the asset information requirements defined in the Asset Information Strategy. Asset Information Systems includes consideration of the following;

- The asset information systems and architecture necessary to deliver the information system business requirements defined in the Asset Information Strategy;
- Analysis of the costs and benefits of implementing new or updated asset information systems to meet the business requirements;
- How the asset information system requirements can be delivered in accordance with the organization's IT strategy.
- An evaluation of how systems can be used to automate business processes;
- An assessment of whether to acquire a 'vanilla' best of breed solution and align the business processes to the system, or to modify an existing system or to develop a bespoke software solution;
- Asset Information Systems implementation plan including governance arrangements;
- An asset information system migration plan to move from the current systems to the required architecture;
- Clearly defined system ownership responsibilities.

Artefacts:

Typical artefacts within this Subject include:

- IT Strategy
- Information Systems Architecture
- Information Systems Strategy and Business Cases
- Information Systems Implementation and Migration Plan
- Information System governance and ownership arrangements

Related Subjects:

- Asset Information Strategy
- Asset Information Standards
- Data & Information Management

Relevant Standards:

- Clause 7.5 of ISO 55001
- ISO 27000/1/2

Data & Information Management

Definition:

The data and information held within an organization's asset information systems and the processes for the management and governance of that data and information.

Context:

Data and Information Management covers the data held within an organization's asset information systems and the quality and accuracy of that data, compared to the requirements defined in the Asset Information Strategy and asset information standards.

Data and Information Management includes the processes for data management which would typically include a definition of data owners, consumers, validation processes, and the expected life of the data. This includes any data collection and maintenance plans where the Asset Information Strategy has shown a gap in the organization's current asset information.

Data and Information Management also includes the governance processes for providing the organization with a level of assurance that the data and information within the organization's asset information systems is fit for purpose and is consistent with the asset information standards and quality and accuracy requirements.

Artefacts:

Typical artefacts within this Subject include:

- Data collection plans
- Data management procedures
- Data governance procedures
- Data assurance and audit reports;

Related Subjects:

- Asset Information Strategy
- Asset Information Standards
- Asset Information Systems

Relevant Standards:

- Clause 7.5 of ISO 55001
- ISO 27000/1/2

Asset Management
Global Forum on Maintenance

Asset Management Leadership

Definition:

The leadership of an organization required to promote a whole life asset management approach to deliver the organizational and Asset Management objectives of the organization.

Context:

Leadership can be defined as the exercise of power to influence people toward a vision and a purpose. Leaders have the ability to influence each other to achieve the objectives of the organization, to encourage team work and to lead by example. In the context of Asset Management therefore, Leadership is concerned with the influence of people to deliver the Asset Management strategy and objectives of an organization.

Asset Management Leadership covers the planning and establishment of the organizational leadership team, defining its responsibilities and accountabilities for Asset Management and defining the leadership style needed to support Asset Management in the organization. It includes the need to identify the interfaces of Asset Management activities with other organizational activities. The leadership style of an organization should support the achievement of the organizational and Asset Management objectives. For asset management to be successful, employees should understand these objectives, and their role in achieving them and this requires leadership from all levels of the organization.

Leadership is a process involving leaders and followers. It enables teamwork to be translated into planned results, potentially achieving a level of excellence. Leadership becomes a process when it becomes more active and there is no longer a single leader. In this case, role models for all are guided by the values and beliefs of the organization, which are consistent with their culture and context and teamwork is visible.

Artefacts:

Typical artefacts within this Subject include:

- Leadership Management Strategy
- Leadership Competencies
- Leadership Gap Analysis
- Leadership Continuity Management Plan
- Leadership Accountability Descriptions

Related Subjects:

- Asset Management Strategy
- Organizational Structure
- Organizational Culture
- Competence Management

Relevant Standards:

- Clause 5.1 of ISO 55001

Organizational Structure

Definition:

The structure of an organization in terms of its ability to deliver the organizational and Asset Management objectives.

Context:

The design of an Organizational Structure determines how roles and responsibilities are assigned within an organization and sets the requirements for information flows between different departments, functions and management levels. The appropriate organizational design depends on a number of internal and external elements that can affect organizational structure such as:

- Size of the organization
- Ownership structure – private, government, listed company
- Type of industry, products or services
- Objectives and strategies of the organization
- Maturity of the organization – start-up or established business
- Diversity of the organization – single site, single country or large multinational
- Cultural background.

All of these can have an impact on the performance of the organization, the way an organization is structured, the leadership style and acceptable behaviours. Organizational design can also create different outcomes in behaviour and culture. It is therefore important to align the organization's design with the desired leadership style and culture: misalignment can lead to a less than desirable outcome. Different organizational structures include:

- Functional structure;
- Decentralised structure;
- Matrix structure.

Artefacts:

Typical artefacts within this Subject include:

- Organizational Chart
- Organizational Roles, Responsibilities and Authorities
- Job Descriptions or Position Descriptions.

Related Subjects:

- Asset Management Strategy
- Organizational Culture
- Asset Management Leadership
- Competence Management

Relevant Standards:

- Clause 5.3 of ISO 55001

Organizational Culture

Definition:

The culture of an organization in terms of its ability to deliver the organizational and Asset Management objectives.

Context:

Culture is an extremely complex phenomenon. Culture is the lens through which individuals understand the world. To understand a culture one must understand that much of human communication occurs through a system of symbols, and these symbols are dependent on context. It is important to understand that these symbols have no absolute meaning where they differ between cultures and contexts. Every culture has its rules, values, behavioural patterns and myths maintained by rites and rituals.

Culture is a way of giving meaning to experience. All knowledge is relevant to culture. The wrong cultural lenses can inhibit excellence if, for example, an organization sees through the lens of complacency, and not of operational discipline.

Understanding culture as a factor which structures our actions is crucial. There is no “standard” or “rulebook” for excellence in workplace culture; but excellence in workplace culture is what enables excellence in Asset Management. The culture of an organization serves as a blueprint for making decisions. The culture of a company is always dynamic, and the goal is to identify and understand the processes of the culture of an organization; not to change the culture directly, but to manage through it.

Organizational Culture is about the process of defining and then developing a culture that supports the goals of the organization and will help to deliver the Asset Management objectives of an organization.

Artefacts:

Typical artefacts within this Subject include:

- Culture Management Strategy
- Defined Organizational Values
- Outputs from Culture Surveys
- Behavioural patterns, Rites and Rituals

Related Subjects:

- Asset Management Leadership
- Organizational Structure
- Competence Management

Relevant Standards:

- Clause 4.1 of ISO 55001

Competence Management

Definition:

The processes used by an organization to systematically develop and maintain an adequate supply of competent and motivated people to fulfil its asset management objectives including arrangements for managing competence in the boardroom and the workplace

Context:

Competence Management is about managing the ability of individuals in asset management roles to perform their work activities as well as expected. This calls for a mix of practical and thinking skills, underpinned by knowledge and understanding relevant to the activity being carried out, and is strongly influenced by personal attributes and by a person's attitudes and beliefs. Because asset management is multidisciplinary and cross functional, it requires people who can work effectively in multidisciplinary teams; are open to the evidence, methodologies and approaches used by people from different backgrounds and know how to integrate and interpret these in decision-making.

A strategic approach to managing competence and behaviour should cover the development of both individual and organizational competence. People come into asset management roles from a range of different professional, technical, operational and commercial backgrounds, bringing with them different concepts, perspectives, methodologies and networks. Knitting these together to form coherent and effective asset management teams should be a key component of Asset Management strategy and planning.

Competence requirements describe what people should be able to do and what they need to know and understand. They are typically brought together in frameworks which are tailored to the organization or occupational group. Best practice frameworks combine definitions of input requirements, output measures and desired behaviours.

Competence Management also includes the periodic assessment of individuals against a competence framework, the identification of training needs or other development needs and the delivery of the required training and development.

Artefacts:

Typical artefacts within this Subject include:

- Competence Framework
- Competence Assessment Processes
- Training Needs Analysis
- Training Course Specifications

Related Subjects:

- Asset Management Leadership
- Organizational Structure
- Organizational Culture

Relevant Standards:

- Clause 7.2 of ISO 55001

Procurement & Supply Chain Management

Definition:

The processes used by an organization to ensure that all outsourced Asset Management activities are aligned with the Asset Management objectives of the organisations and to monitor the outcomes of these activities against these objectives.

Context:

The activities necessary to create, manage, maintain, and enforce contract and supplier management over the entire lifecycle of an asset. Procurement & Supply Chain Management includes; authoring, negotiations, adoption, definition of requirements, appraisal & selection of contractors, outsourcing – insourcing strategies and claim management. These elements are of high priority with regard to realizing expected savings. Procurement & Supply Chain Management needs to align with corporate standards and to ensure that negotiated savings reach the bottom line.

Procurement & Supply Chain Management typically focuses on:

- Selection criteria for external contractors
- Safety in design where applicable
- Standardized contract processes.
- Improved contract compliance.
- Internal – external collaboration.
- Warehouse management
- Monitoring & review of supplier performance.

Artefacts:

Typical artefacts within this Subject include:

- Procurement Policy
- Outsourcing- insourcing Policy
- Contractor selection criteria
- Contracts
- Service Level Specifications
- Supplier assessments, including review reports
- Improvement plans

Related Subjects:

- Strategic Planning
- Asset Creation & Acquisition
- Maintenance Delivery

Relevant Standards:

- ISO 28000/1/2/3/4 - Specification for security management systems for the supply chain
- ISO 17365 - Supply chain applications of RFID. Transport units
- ISO 17364 - Supply chain applications of RFID. Returnable transport items (RTIs)

Risk Assessment and Management

Definition:

The policies and processes for identifying, quantifying and mitigating risk and exploiting opportunities.

Context:

Risk Assessment and Management describes policies and processes for the identification, assessment, analysis and treatment of risks and opportunities. Risk Assessment and Management is common to all subjects within the Asset Management Landscape.

The management activities within the scope of this subject are:

- Generation of Risk Management Policies
- Development of Risk Management Processes
- Execution of Risk Management Processes
- Alignment of strategic, tactical and operational risks and risk registers
- Risk mitigation strategies

Artefacts:

Typical artefacts within this subject include:

- Risk Management Policy
- Risk Management Strategy
- Risk Management Procedures
- Risk Registers
- Risk Criteria
- Risk Profile
- Risk Action Requests
- Risk Profile Reports
- Risk Measures

Related Subjects:

- Asset Management Strategy
- Lifecycle Value Realisation
- Capital Investment Decision-making
- Operations & Maintenance Decision-making

Standards:

- ISO 31000:2009 - Risk management — Principles and guidelines
- IEC/ISO 31010 - 2009 Risk management – Risk assessment techniques
- HB 327:2010 - Communicating and consulting about risk

Contingency Planning & Resilience Analysis

Definition:

The processes and systems put in place by an organization to ensure it is able to continue either to to continue to operate its assets to deliver the required level of service in the event of an adverse impact or maintain the safety and integrity of the assets(whether or not the operate).

Context:

Establish the required procedures and documents to guide the person in charge of the assets during the event to take the appropriate decisions in such critical times based on well prepared and tested scenarios.

These documents will typically include:

- Identifying the various events, incidents, and disasters.
- Establishing the level of command and the person in charge of each event type.
- Identifying the required support organizations, with their specified responsibilities, needed for each type of event (or phase of an event).
- Classifying the events and the recommended actions according to each type of event.
- Reference to all needed contacts required during all possible scenarios.

All the possible scenarios need to be put to test during regular times to evaluate both the processes put in place and the reaction of personnel during these adverse events.

Artefacts:

Typical artefacts within the subject include:

- Written and approved contingency plan
- Approved and signed agreements between all parties and expectations during these events
- Responsibility matrix and escalation policy
- Reference to assets operating procedures

Related Subjects:

- Faults & Incident Response

Relevant Standards:

- None Identified

Global Forum on Maintenance and Asset Management

Sustainable Development

Definition:

The interdisciplinary, collaborative processes used by an organization to ensure an enduring, balanced approach to economic activity, environmental responsibility and social progress to ensure all activities are sustainable in perpetuity.

Context:

Sustainable Development entails ensuring that all Asset Management processes support the organization's sustainability framework. This entails integration of the Asset Management strategy, policy and plans with the organization's strategic plans and activities and stakeholder needs.

It ensures appropriate systems are put into place to collect and collate information needed to manage assets across their whole life cycle.

Factors to be taken into account in these processes include:

- Environmental Impact of Asset Management Plans
- Social Impact of Asset Management Plans
- Financial Impact of Asset Management

Artefacts:

Typical artefacts within this Subject include:

- Environmental Impact Plan
- Social Development Plan
- Skills Development Plan
- Financial Plan
- Asset Management Strategy and Policy

Related Subjects:

- Asset Management Policy
- Asset Management Strategy
- Capital Investment Decision-Making
- Lifecycle Value Realisation
- Risk Assessment and Management
- Asset Information Management

Relevant Standards:

- None Identified

Global Forum on Maintenance and Asset Management

Management of Change

Definition:

An organization's processes for the identification, assessment, implementation and communication of changes to people, processes and assets.

Context:

Management of Change describes policies and processes for dealing with changes to physical assets their management systems or supporting resources. This subject also includes elements of mitigating the impacts of change.

The management activities within the scope of this subject are:

- Development of Change Management policies
- Development of Change Management processes
- Execution of Change Management Processes

Artefacts:

Typical artefacts within this subject include:

- Documented Management of Change Process
- Change Management Register
- Change Management Plan

Related Subjects

- Risk Assessment and Management

Standards:

- None Identified

Global Forum on Maintenance and Asset Management

Asset Performance and Health Monitoring

Definition:

The processes and measures used by an organization to assess the performance and health of its assets using performance indicators.

Context:

Asset Performance and Health Monitoring typically include the following elements:

- Define critical measures across all of the asset lifecycle stages that clearly link to the organizational objectives;
- Establish monitoring programs for the evaluation of performance measures, analysis of outcomes and the use of this information for management decision making and action plans;
- Establish clear criteria for understanding when there is a deviation of the asset from the required level of performance;
- Establish processes that provide essential information to determine whether the asset is performing in accordance with its management policies, standards, strategic plans, procedures, objectives and performance targets;
- Establish process for monitoring, measuring and evaluating the performance of the asset across all stages of the lifecycle;
- Monitor asset performance against the prescribed criteria and identify where there are deviations between the desired level of performance and the current level of performance; and
- Establish monitoring and reporting that allows for the prediction of future asset performance and health.

Artefacts:

Typical artefacts within this Subject include:

- Asset Performance Reports
- Asset Health Reports
- Asset Performance Objectives
- Asset Health Objectives

Related Subjects:

- Asset Management Strategy
- Asset Management Systems Monitoring

Relevant Standards:

- None Identified

Asset Management System Monitoring

Definition:

The processes and measures used by an organization to assess the performance and health of its Asset Management System.

Context:

Asset Management System Monitoring is concerned with assessing the performance of or organization's Asset Management System - as opposed to the performance of the assets and asset systems which is covered by the subject: Asset Performance and Health Monitoring. Note, Asset Management System is the management system used to manage an organization's assets and not the Asset Information System(s) which is discussed as a separate subject.

The primary aim of Asset Management System Monitoring is to evaluate the extent to which the Asset Management System is fit for purpose and is that the organization is delivering its Asset Management objectives. There are three key aspects to Asset Management System Monitoring:

- An assessment as to whether the Asset Management System is fit for purpose.
- An assessment of the extent to which the organization is following the processes, decision-making criteria and other guidance that is defined within the Asset Management System; and
- An assessment as to whether the outcomes from the processes, decision-making criteria and other guidance are in line with the expected outcomes. This is likely to include the consideration of asset performance (as discussed in the Asset Performance and Health Monitoring subject) as well as the evaluation of process performance and the performance of the people involved in running the Asset Management System.

These aspects are typically assessed by a combination of assurance processes and audits.

Artefacts:

Typical artefacts within this Subject include:

- Asset Management Steering Group meetings
- Management Review Meeting minutes

Related Subjects:

- Asset Performance and Health Monitoring
- Management Review, Audit & Assurance

Relevant Standards:

- Clauses 9.1, 9.2 & 9.3 of ISO 55001

Management Review, Audit & Assurance

Definition:

An organization's processes for reviewing and auditing the effectiveness of its asset management processes and asset management system.

Context:

Management Review Audit & Assurance describes policies and processes for internal assurance processes, audit policies and procedures, internal and third party audits, processes for reviewing audit findings and corrective actions and the use of external benchmarking.

The management activities within the scope of this subject are:

- Development of Audit Policies
- Development of Audit Processes
- Execution of Audit Processes

Artefacts:

Typical artefacts within this subject include:

- Audit policy
- Documented audit procedures
- Audit schedule
- Documented audit methodologies
- Documented audit results

Related Subjects:

- Assets Performance & Health Monitoring
- Asset Management System Monitoring

Standards:

- ISO 19011:2011 - Guidelines for auditing management systems

Asset Management
Global Forum on Maintenance

Asset Costing & Valuation

Definition:

An organization's processes for defining and capturing 'as built', maintenance and renewal unit costs and the methods used by an organization for the valuation and depreciation of its assets.

Context:

Asset costing is the structure/framework that defines the composition of all costs related to an asset. Asset Valuation refers to accounting or econometrics rules that allow the value estimation or prediction for assets over their lifecycle through the variation of Asset Costing over its operating life horizon. Asset Costing makes the assets' decomposition of an organization (asset portfolio of individual assets and asset systems) and the accounting decomposition match.

Artefacts:

Typical artefacts within this Subject include:

- Expenditure reports
- Asset valuation register
- Documented valuation methodology
- Documented costing processes

Related Subjects:

- Asset Management Planning
- Capital Investment Decision-Making
- Lifecycle Value Realisation
- Asset Information Systems
- Data & Information

Relevant Standards:

- Relevant accounting standards
- None Identified

Asset Management
Global Forum on Maintenance

Stakeholder Engagement

Definition:

The methods an organization uses to engage with stakeholders.

Context:

Stakeholder Engagement describes policies and processes for scenario development, identifying, communicating and interacting with Asset Management stakeholders.

The management activities within the scope of this subject are:

- Development of Stakeholder Policies
- Application of Stakeholder Processes
- Execution of Stakeholder Processes
- Elicitation of Stakeholder Requirements

Artefacts:

Typical artefacts within this subject include:

- Documented stakeholder analysis
- Stakeholder management plan
- Documented stakeholder scenarios for approval

Related Subjects

- Asset Management Policy
- Asset Management Strategy
- Demand Analysis
- Strategic Planning
- Asset Management Planning
- Capital Investment Decision-Making
- Operations & Maintenance Decision-Making

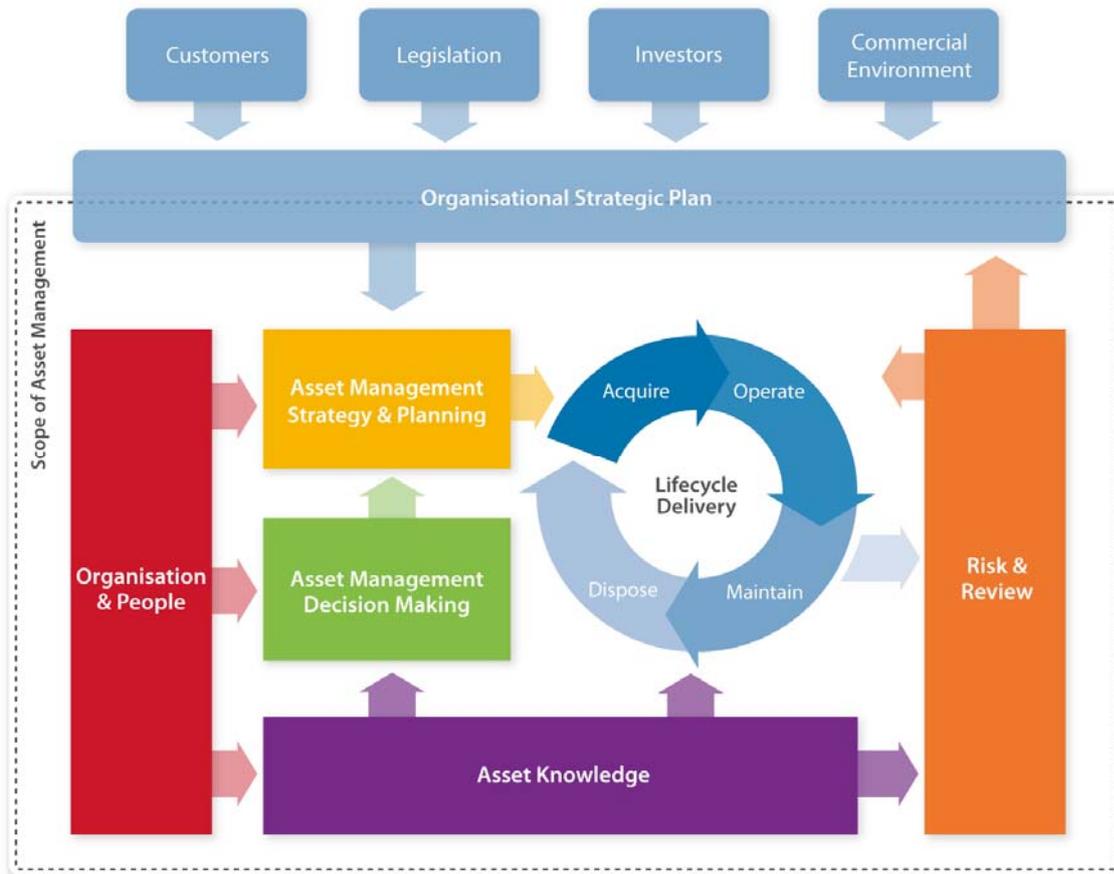
Standards:

- Clause 4.2 of ISO 55001

Asset Management
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7 Appendix A: Asset Management Concept Models

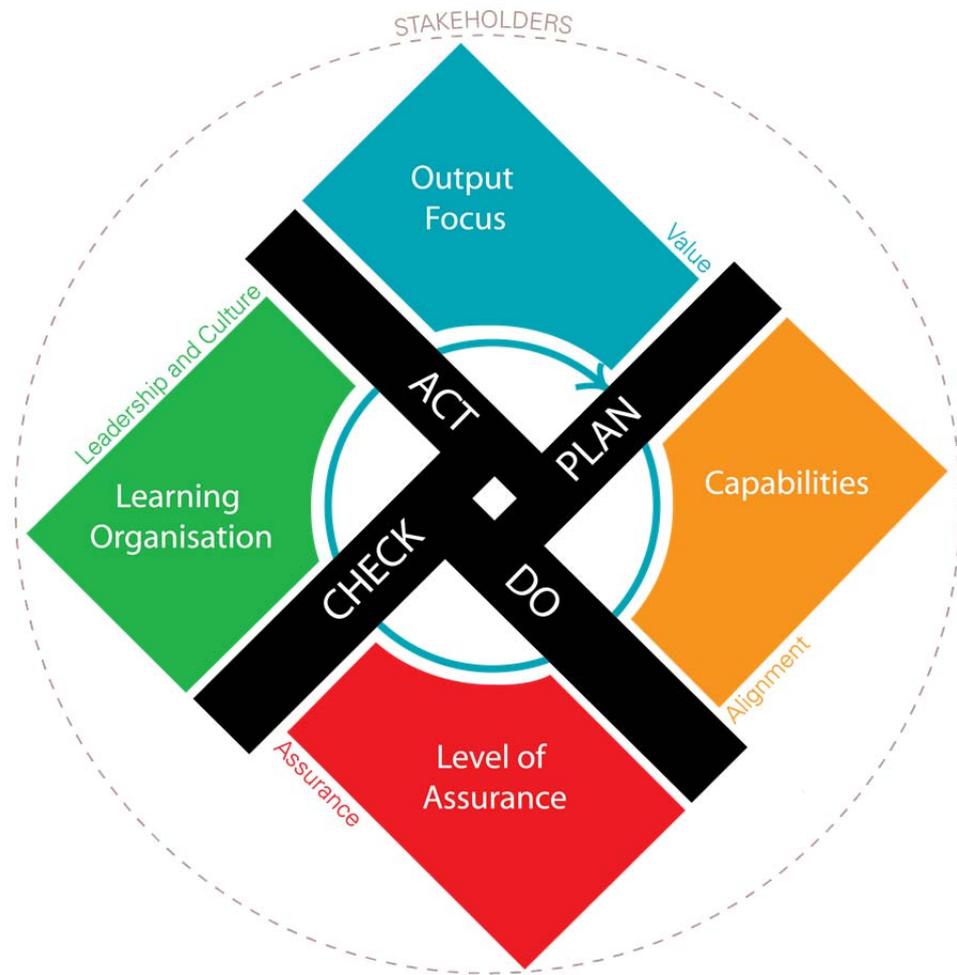
Example conceptual models from three of GFMAM's member organizations are shown below.



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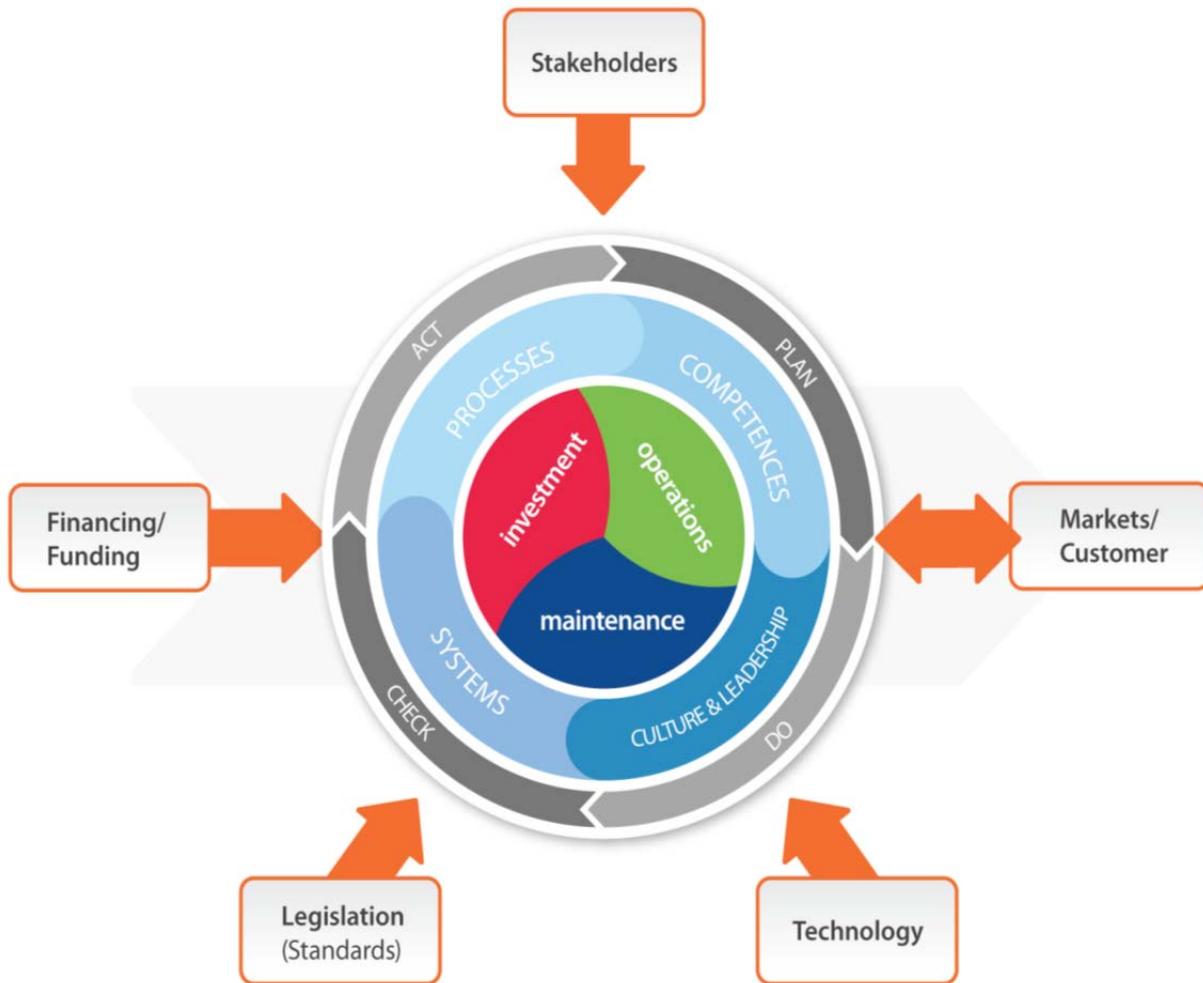
The IAM Conceptual Model for Asset Management

Global Forum on Maintenance & Asset Management



Asset Management Council "Asset Capability Concept Model"

Asset Management Council
Global Forum on Maintenance



EFNMS Conceptual Model for Asset Management

The Asset Management Landscape
 Global Forum on Maintenance

8 Appendix B: Landscape Review

8.1 Review Process

The review process consisted of the following stages:

- Development of descriptions of each Subject by mapping the Landscape Subjects to the Fundamentals defined in the ISO 55000 series of standards at a Strategic, Tactical and Operational Level;
- Analysis of these descriptions to identify the Action, Object, Artefacts and Qualifiers for each Subject;
- Review of these descriptions to remove or reallocate statements that did not align with the Subject heading;
- Independent review of the output from the above stages by a Lead Reviewer;
- Definition of criteria to assess the validity of a Subject; and
- Review of the Subjects against these criteria and propose changes to the Subjects.

8.2 Criteria

The criteria that were defined to decide what constitutes a valid Subject were as follows:

- A. The Subject should be of interest to the asset management domain;
- B. The Subject should contain at least one clear concept;
- C. The Subject should contain concept(s) that are mutually exclusive to other Subjects;
- D. The Subject should describe where possible a system or series of processes. Artefacts are not in themselves sufficient to be a Subject;
- E. Subjects can cover what/why in one Subject and how in another; therefore Subjects are not required to have all decision making levels in that Subject;
- F. The Subject should not contain more than one main concept / process / capability; and
- G. The Subject should be consistent with the ISO 55000 series of standards.

8.3 Subject Descriptors

A Subject descriptor page has been produced for each Subject which is intended to help the understanding the definition and scope of each Subject. Each of these Subject descriptors covers the following items:

- The definition of each Subject;
- A context statement for each Subject;
- The artefacts that would typically be produced for each Subject;
- Key relationships with other Subjects; and
- Any relevant standards.

These Subject Descriptors are shown in Appendix 1.

9 Appendix C: GFMAM Asset Management Landscape Subjects First and Second Edition

The output from the review is described in the table below showing the subjects from the first edition of the Landscape and the changes in this Second Edition and the rationale for these changes.

Ref	Landscape First Edition Subject	Landscape Second Edition Subject	New Ref	Rationale for change
1	Asset Management Policy	Asset Management Policy	1	No Change
2	Asset Management Strategy	Asset Management Strategy & Objectives	2	No Change
3	Demand Analysis	Demand Analysis	3	No Change
4	Strategic Planning	Strategic Planning	4	No Change
5	Asset Management Plan	Asset Management Planning	5	Subject should describe the activity not the output
6	Capital Investment Decision-Making	Capital Investment Decision-Making	6	No Change
7	Operations & Maintenance Decision-Making	Operations & Maintenance Decision-Making	7	No Change
8	Whole-life Cost & Value Optimisation	Lifecycle Value Realisation	8	Change name to Lifecycle Value Realisation to align with ISO
9	Resourcing Strategy & Optimisation	Resourcing Strategy	9	Name change to eliminate optimisation from Subject name
10	Shutdowns & Outage Strategy & Optimisation	Shutdowns & Outage Strategy	10	Name change to eliminate optimisation from Subject name
11	Aging Assets Strategy	Include in Lifecycle Value Realisation		Fails criterion C - therefore combine with Lifecycle Value Realisation
12	Technical Standards & Legislation	Technical Standards & Legislation	11	No Change
13	Asset Acquisition & Commissioning	Asset Creation & Acquisition	12	Name change to better describe delivery activities
14	Systems Engineering	Systems Engineering	13	No Change
15	Configuration Management	Configuration Management	14	No Change
16	Maintenance Delivery	Maintenance Delivery	15	No Change
17	Reliability Engineering	Reliability Engineering	16	No Change
18	Asset Operations	Asset Operations	17	No Change
19	Resource Management	Resource Management	18	No Change
20	Shutdown & Outage Management	Shutdown & Outage Management	19	No Change
21	Fault & Incident Response	Fault & Incident Response	20	No Change
22	Asset Rationalisation and Disposal	Asset Decommissioning and Disposal	21	Name change to better describe delivery activities
23	Asset Information Strategy	Asset Information Strategy	22	No Change
24	Asset Knowledge Standards	Asset Information Standards	23	Name change for better consistency

Ref	Landscape First Edition Subject	Landscape Second Edition Subject	New Ref	Rationale for change
25	Asset Information Systems	Asset Information Systems	24	No Change
26	Asset Data and Knowledge	Data & Information Management	25	Name change only
27	Contract & Supplier Management	Procurement & Supply Chain Management	26	Name change to align with ISO terminology
28	Asset Management Leadership	Asset Management Leadership	27	No Change
29	Organizational Structure & Culture	Organizational Structure	28	Fails criterion F - therefore split out culture
		Organizational Culture	29	Fails criterion F - therefore split out culture and combine with behaviour
30	Competence & Behaviour	Competence Management	30	Fails criterion F - therefore split out behaviour which is part of Culture
31	Criticality, Risk Assessment and Management	Risk Assessment and Management	31	Name change only
32	Contingency Planning & Resilience Analysis	Contingency Planning & Resilience Analysis	32	No Change
33	Sustainable Development	Sustainable Development	33	No Change
34	Weather and Climate Change	Include in Risk Assessment		Fails criterion C - therefore combine with Risk Assessment & Management
35	Asset & Systems Change Management	Management of Change	34	Name change only
36	Assets & Systems Performance & Health Monitoring	Assets Performance & Health Monitoring	35	Fails criterion F - therefore split into two
		Asset Management System Monitoring	36	Fails criterion F - therefore split into two
37	Management Review, Audit & Assurance	Management Review, Audit & Assurance	37	No Change
38	Accounting Practices	Asset Costing & Valuation	38	Name change only
39	Stakeholder Relations	Stakeholder Engagement	39	Name change only

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