



Qualifications Design Group

## Consultation Project, January 2011

# Proposed new IAM professional qualifications

- Certificate in Asset Management
- Diploma in Asset Management

## 1 Introduction

- 1.1 As an expression of its commitment to the professional development of those involved with physical asset management, the Institute of Asset Management has developed draft proposals for the content and structure of two new qualifications: a Certificate in Asset Management and a Diploma in Asset Management. The project is being guided by an advisory Qualifications Design Group consisting of representatives of the IAM and industry practitioners.
- 1.2 The **Certificate** will be aimed primarily – but *not* exclusively – at those new to the discipline or with a limited amount of experience. It is designed to cover the key topics of asset management.
- 1.3 The **Diploma** will be aimed primarily – but also *not* exclusively – at those with more knowledge and experience of asset management, possibly with greater involvement in specialist areas and, for instance, having more line-managerial responsibility for staff and for budgetary planning and control.
- 1.4 The **Certificate** and **Diploma** will consist of individual **Modules** covering the key subjects for each.
- 1.5 Currently it is proposed that the Certificate will comprise five Modules, successful completion of all of which will be mandatory for gaining the qualification; and that the Diploma will comprise 15 Modules, of which it is currently planned seven will be mandatory which, with a further selection of four from the remaining eight Optional Modules, will need to be satisfactorily completed to gain the award.
- 1.6 Details are provided here of the ‘evidence of competence’ requirements for each Module in the qualifications: these competence statements are derived directly from the IAM Competence Framework. In addition, there are direct links to the IAM Knowledge Centre.
- 1.7 This document, which contains the full, draft contents for the IAM Certificate and Diploma, setting out the key topics and the knowledge specifications for each, has been produced primarily for industry-wide consultation, to accompany the Consultation Questionnaire (which can be found on and downloaded from the IAM Website: [www.iam.org](http://www.iam.org)).

## 2 IAM Certificate in Asset Management

2.1 The following is proposed for the content of the Certificate:

Five Modules, all mandatory, covering these main subject areas:

- (C1) Introduction to Physical Asset Management
- (C2) Business impact: quantification
- (C3) Delivery life-cycle
- (C4) Risk
- (C5) Asset knowledge systems

## 3 IAM Diploma in Asset Management

3.1 The following is proposed for the content of the Diploma:

Fifteen Modules, covering these main subject areas:

- (D1) Asset management: policy and strategy
- (D2) Planning for effective asset management
- (D3) Asset related risk
- (D4) Asset information
- (D5) Life-cycle delivery
- (D6) Asset management capability
- (D7) Performance management, review and improvement
  
- (D8) Change management
- (D9) Contractor and supplier management
- (D10) Asset lifecycle delivery
- (D11) Sustainability
- (D12) Demand forecasting
- (D13) Whole-life costing
- (D14) Asset management knowledge systems
- (D15) Capital expenditure planning

It is planned that Modules D1, D2, D3, D4, D5, D6, and D7 will be Mandatory; and that achievement of the full award will require completion of a selection of four of the remaining eight Modules (D8 – D15).

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# The IAM Certificate in Asset Management

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IAM Certificate

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## Module (C1): Introduction to physical asset management

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### Summary

An asset management policy is the cornerstone of an organization's approach to asset management. As such it provides both the confidence that the organization is translating its overall organizational strategic plan into an effective asset management plan, and provides the start of an organization's 'line of sight', the golden thread of rationale which ultimately justifies every asset management activity the organization undertakes.

'Line of sight' is an essential concept for effective asset management. The project manager or technician at the 'sharp end' of an organization should be able to trace the rationale for what he or she is doing upwards through a clear set of plans, objectives and strategic statements to something in the organizational strategic plan (that is, the organization's topmost vision). This requires a clear framework within which asset management decision-making is made and presented. The purpose of the asset management policy is to set out this framework.

Topics to be covered in this Module: what the IAM regards asset management to be; and considerations of the importance of asset management in the wider context of different types of business and operating environments.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Policy Development

- E1.1.1 Define the corporate goals the AM Policy must help achieve
- E1.1.2 Define the stakeholder requirements the AM Policy must address
- E1.1.3 Define the opportunities and constraints the AM Policy must take into account
- E1.1.4 Define the stakeholder groups and socio-economic issues the AM Policy must take into account

#### Asset Management Planning

- E3.1.1 Define criteria for identifying and evaluating investment options
- E3.1.2 Identify investment options for achieving the AM Strategy and AM objectives
- E3.1.3 Analyse the costs, risks and benefits of investment options
- E3.1.4 Select and justify the most appropriate investment options
- E3.1.5 Evaluate detailed investment plans

#### Risk Management and Performance Improvement

- E6.1.1 Define and manage risk management processes and procedures
- E6.2.1 Identify and assess risks arising from AM activities
- E6.2.2 Specify measures and methods for controlling identified risks
- E6.2.3 Identify improvements needed to working practices and procedures
- E6.2.4 Monitor the progress and impact of improvement actions
- E6.2.5 Integrate AM related risk management with organizational risk management systems

### Proposed generic knowledge & understanding requirements (Capability Development)

- Continuing professional development processes
- Resource Management approaches, techniques and tools
- Project management principles and the importance of operating to cost, quality and time obligations
- The complexity, impacts and priorities of critical projects and of multiple projects
- Training needs analysis
- Resource scheduling tools and techniques
- The information required to undertake workforce planning
- Service Level Agreements and contractual management including performance criteria and shared risk/reward mechanisms
- Materials, logistics and supply chain management
- Financial evaluation methods and value-for-money criteria
- Organizational procedures and systems
- Continuous improvement principles and processes
- The main models and methods for managing change effectively, and their strengths and weaknesses
- The political, bureaucratic and resource barriers to change and the techniques that deal with these
- How to manage customer, staff, supplier and other stakeholder expectations during change

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- The concept of culture as applied to organizations
- The importance of values in underpinning individual and organizational culture
- The principles and methods of managing culture change within organizations
- Your organization's vision and strategy and current organizational culture
- Values, assumptions and behaviours that are consistent and inconsistent with your vision and strategy

IAM Certificate

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## Module (C2): Quantification of business impact

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### Summary

The key to making sound asset management decisions is the acquisition of appropriate knowledge and the decision making framework that is in place within an asset management organization. An asset management strategy should be in place which is derived from and consistent with the asset management policies.

Having a consistent asset management strategy and asset management policies provides a stable framework to allow joined-up decision making. The asset management policy provides the overarching principles which are in place to enable the asset management strategy, objectives and plans to be produced and implemented.

Topics to be covered in this Module: making informed decisions about asset management and the need for such decisions; and the trade-offs to be considered and accepted/rejected.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Strategy Development

- E2.1.1 Define the AM Policy aims and objectives the AM Strategy must achieve and support
- E2.1.2 Define all risks the AM Strategy must take into account
- E2.1.3 Define the constraints the AM Strategy must take into account
- E2.1.4 Define the implications of current and forecast asset condition for AM Strategy development
- E2.1.5 Analyse the current and future customer requirements the AM Strategy must take into account
- E2.1.6 Define the legal, social, environmental and economic factors and trends the AM Strategy must take into account
- E2.1.7 Define the stakeholder groups the AM Strategy must take into account
- E2.2.1 Use effective tools and techniques to analyse current demands
- E2.2.2 Use historical data to support forecasts of demand and costs
- E2.2.3 Use effective tools and techniques to forecast costs and demands
- E2.2.4 Forecast and assess relevant external products and technological developments and the effects of these

#### Asset Management Planning

- E3.1.1 Define criteria for identifying and evaluating investment options
- E3.1.2 Identify investment options for achieving the AM Strategy and AM objectives
- E3.1.3 Analyse the costs, risks and benefits of investment options
- E3.1.4 Select and justify the most appropriate investment options
- E3.1.5 Evaluate detailed investment plans

#### Implement Asset Management Plans

- E4.2.1 Review and update existing maintenance and/or refurbishment strategies
- E4.2.2 Develop risk based maintenance and /or refurbishment workplans
- E4.2.3 Specify spares management and inventory requirements
- E4.2.4 Plan the distribution of spares and supplies
- E4.2.5 Identify appropriate condition assessment techniques
- E4.2.6 Assess asset condition and performance and modify maintenance plans and regimes as required
- E4.2.7 Evaluate options for extending the life of assets
- E4.3.1 Review asset performance and capacity against current requirements to identify proposals for rationalization of assets
- E4.3.2 Evaluate asset rationalization within a cost-risk optimization framework
- E4.3.3 Make sure rationalization projects are fully defined and assessed including their impact on other potential projects
- E4.3.4 Make sure rationalization projects are implemented and are subject to full post-investment appraisals
- E4.3.5 Make sure the spares management process supports the AM Strategy and Plan(s)
- E4.4.1 Select and justify the optimal strategy based on AM Strategy
- E4.4.2 Identify and plan life-extending, decommissioning, disposal and risk control actions.
- E4.4.3 Manage the implementation of life-extending, decommissioning, disposal and risk control actions
- E4.4.4 Evaluate the effectiveness of life-extending, decommissioning, disposal and risk control actions
- E4.4.5 Make sure assets are disposed of responsibly and ethically

Risk Management and Performance Improvement

- E6.1.1 Define and manage risk management processes and procedures
- E6.1.2 Identify and assess risks arising from AM activities
- E6.1.3 Specify measures and methods for controlling identified risks
- E6.1.4 Identify improvements needed to working practices and procedures
- E6.1.5 Monitor the progress and impact of improvement actions
- E6.1.6 Integrate AM related risk management with organizational risk management systems
- E6.4.1 Identify and monitor relevant legal, regulatory, ethical and social requirements
- E6.4.2 Develop effective policies and procedures to make sure requirements are met
- E6.4.3 Assess the way policies and procedures are put into practice and provide support
- E6.4.4 Audit compliance with relevant legislation and standards
- E6.4.5 Identify and correct any failures to meet requirements
- E6.4.6 Identify reasons where requirements are not met and adjust policies and procedures accordingly

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## Module (C3): Delivery life-cycle

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### Summary

The life-cycle of a physical asset starts with the decision to acquire or develop new assets as part of the overall corporate strategic plan. Once the decision is made, the assets need to be procured, typically from external suppliers or designed, developed and produced internally. The assets must then be installed, tested and formally commissioned before entering service: it is the operational stage in the life-cycle of any asset that represents the greatest source of revenue and, ultimately, the return on investment for the asset-holder. Thereafter, assets must be maintained, modified or refurbished; and eventually decommissioned and scrapped. Life-cycle delivery takes account of all these stages.

Topics to be covered in this Module: defining the life-cycle – consideration of all aspects, from specification to decommissioning and disposal; internal and external factors influencing life-cycle; and the impact and requirements of different types of business.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Appraise investment options

- E3.1.1 Define criteria for identifying and evaluating investment options
- E3.1.2 Identify investment options for achieving the AM Strategy and AM objectives
- E3.1.3 Analyse the costs, risks and benefits of investment options
- E3.1.4 Select and justify the most appropriate investment options
- E3.1.5 Evaluate detailed investment plans

#### Apply whole life costing principles

- E3.2.1 Identify how costs of AM activities and asset values should be determined
- E3.2.2 Identify appropriate whole life costing models
- E3.2.3 Specify costs for all key stages of the AM lifecycle
- E3.2.4 Develop business cases using unit cost data
- E3.2.5 Make sure appropriate decision support tools are available
- E3.2.6 Define the process for tracking, analysing and verifying unit cost data
- E3.2.7 Update whole life cost calculations when unit costs change
- E3.2.8 Identify improvement actions through periodic unit cost reviews

#### Create and acquire assets

- E3.3.1 Analyse business needs for the creation and/or acquisition of assets based on the requirements of the AM Plan(s)
- E3.3.2 Specify appropriate performance indicators for whole life assessment of asset creation and/or acquisition.
- E3.3.3 Assess the costs, risks and benefits of competing asset creation and/or acquisition options
- E3.3.4 Prioritize investment projects based on their total business impact.
- E3.3.5 Prepare business cases which evaluate the costs, benefits and risks of proposed solutions based on the AM Plan(s).
- E3.3.6 Identify risks in the commissioning process and assess their impact on current operations and AM activities.

#### Plan for contingencies

- E3.5.1 Specify the range, volume and quality of AM activities and projects needed to achieve the AM Strategy
- E3.5.2 Define objectives and performance indicators for all AM activities and projects which align with the AM Strategy
- E3.5.3 Define, monitor and review the effectiveness of planning and communication processes
- E3.5.4 Define and justify asset group strategies and specific asset policies
- E3.5.5 Develop an AM Plan which describes how asset management activities and projects will be resourced, managed and evaluated
- E3.5.6 Define resources and services required to deliver the AM Plan(s)

#### Control operations

- E4.1.1 Develop risk based implementation plans and objectives in line with operations, maintenance and/or refurbishment strategy
- E4.1.2 Review and update existing operations strategy

- E4.1.3 Develop operations work and resource plans
- E4.1.4 Develop and evaluate work management processes
- E4.1.5 Manage the delivery of workplans including managing changes and the impact of unplanned work
- E4.2.1 Review and update existing maintenance and/or refurbishment strategies

Maintain assets

- E4.2.2 Develop risk based maintenance and /or refurbishment workplans
- E4.2.3 Specify spares management and inventory requirements
- E4.2.4 Plan the distribution of spares and supplies
- E4.2.5 Identify appropriate condition assessment techniques
- E4.2.6 Assess asset condition and performance and modify maintenance plans and regimes as required
- E4.2.7 Evaluate options for extending the life of assets

Optimize and rationalize assets

- E4.3.1 Review asset performance and capacity against current requirements to identify proposals for rationalization of assets
- E4.3.2 Evaluate asset rationalization within a cost-risk optimization framework
- E4.3.3 Make sure rationalization projects are fully defined and assessed including their impact on other potential projects
- E4.3.4 Make sure rationalization projects are implemented and are subject to full post-investment appraisals
- E4.3.5 Make sure the spares management process supports the AM Strategy and Plan(s)

Renew or dispose of assets

- E4.4.1 Select and justify the optimal strategy based on AM Strategy
- E4.4.2 Identify and plan life-extending, decommissioning, disposal and risk control actions.
- E4.4.3 Manage the implementation of life-extending, decommissioning, disposal and risk control actions
- E4.4.4 Evaluate the effectiveness of life-extending, decommissioning, disposal and risk control actions
- E4.4.5 Make sure assets are disposed of responsibly and ethically

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## Module (C4): Risk: anticipation, measurement and management

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### Summary

Risk and review is a fundamental component in the development of sustainable asset management decision making. It facilitates the constant and evolving trade-off between performance, cost and risk whilst providing the feedback and review mechanisms to facilitate the adaptation of objectives and evolution of understanding of asset criticality to the delivery of the business aims.

Risk and review requires an understanding of the organization's tolerance to risk, in terms of safety, environmental, financial, reputational and performance risk, so that criticality can be appropriately defined and decision making processes informed. The development and ongoing management of stakeholder relations is key to understanding, describing and communicating these tolerances.

Topics to be covered in this Module: risk assessment and management: why and how; quality assurance; performance, monitoring and evolution of asset management systems; considerations of risk as function of cost-benefit analysis; risk at business and asset levels; monitoring progress against planned objectives; compliance and audits, including regulatory and statutory requirements; and feedback and continuous improvement.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Assess and manage risk

- E6.1.1 Define and manage risk management processes and procedures
- E6.1.2 Identify and assess risks arising from AM activities
- E6.1.3 Specify measures and methods for controlling identified risks
- E6.1.4 Identify improvements needed to working practices and procedures
- E6.1.5 Monitor the progress and impact of improvement actions
- E6.1.6 Integrate AM related risk management with organizational risk management systems

#### Assure the quality of AM processes

- E6.2.1 Assure the quality of AM products or processes
- E6.2.2 Identify the reasons for quality assurance problems
- E6.2.3 Plan and implement improvements to the quality of AM processes
- E6.2.4 Evaluate the effectiveness of process improvements

#### Monitor and review progress and performance

- E6.3.1 Assess asset condition and performance against AM strategy and objectives
- E6.3.2 Assess the performance of AM activities against AM strategy and objectives
- E6.3.3 Identify and implement corrective actions
- E6.3.4 Analyse the progress, impact and effectiveness of corrective actions
- E6.3.5 Identify lessons learned and adjust AM Strategy, policies and procedures accordingly

#### Review and audit compliance with legal, regulatory, ethical and social requirements

- E6.4.1 Identify and monitor relevant legal, regulatory, ethical and social requirements
- E6.4.2 Develop effective policies and procedures to make sure requirements are met
- E6.4.3 Assess the way policies and procedures are put into practice and provide support
- E6.4.4 Audit compliance with relevant legislation and standards
- E6.4.5 Identify and correct any failures to meet requirements
- E6.4.6 Identify reasons where requirements are not met and adjust policies and procedures accordingly

#### Learn from incidents

- E6.5.1 Investigate root cause of asset or system failures or incidents.
- E6.5.2 Influence investigation of incidents
- E6.5.3 Make effective use of 'lessons learned' information from incidents

IAM Certificate

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## **Module (C5): Asset knowledge systems: systems and procedures**

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### Summary

Asset-intensive organizations rely on asset data, information and asset knowledge as key enablers in undertaking both strategic asset management and operational activities. An overall asset information strategy will define the activities an organization will undertake to ensure that its asset information meets current and future requirements.

The quality of asset data and knowledge should be assessed, understood and managed in order to ensure that it provides effective support to business decision making and processes. Typically, asset-intensive organizations do not have all the asset information they would ideally prefer and the information they have may not be to the required quality. Such organizations will therefore need to assess and prioritize data gathering and data cleansing activities, to focus on areas that will be beneficial.

Since asset knowledge is about understanding, improving asset knowledge may require additional analysis of information and or additional data gathering. Knowledge is by definition developed by people rather than machines and so it is also particularly important to ensure that knowledge is recorded and disseminated.

Topics to be covered in this Module: IT as an asset management tool; selection and use of appropriate systems and procedures; and data collection, storage, maintenance, integration, and value-added.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Define asset information standards

- E7.1.1 Specify asset definition standards to provide a common definition of asset attributes
- E7.1.2 Define asset condition standards and measures and specify how these should be used in condition assessment
- E7.1.3 Specify standard definitions of asset defects and failures
- E7.1.4 Specify asset performance management standards
- E7.1.5 Specify standards which contain common definitions for capturing the utilization of assets
- E7.1.6 Specify functionality and service life requirements for all key asset types
- E7.1.7 Verify that asset knowledge standards are consistent with AM Strategy and Plan(s)

#### Specify, select and integrate AM information systems

- E7.2.1 Specify and validate functional and technical requirements of Information Systems needed to support and integrate AM processes.
- E7.2.2 Identify human factor implications of functional, technical and business requirements
- E7.2.3 Define and plan the integration of Information Systems and Tools
- E7.2.4 Demonstrate appropriate use of Information Systems in supporting the delivery of AM Strategy and Plan(s)
- E7.2.5 Make sure AM Information Systems produce relevant usable data in a cost-effective manner
- E7.2.6 Monitor the implementation of Information Systems and Tools

#### Make appropriate AM data available for decision making

- E7.3.1 Develop effective and relevant AM data collection criteria and processes
- E7.3.2 Plan and manage the collection, maintenance and updating, storage and dissemination of AM information
- E7.3.3 Process and analyse AM data to provide effective business information as required
- E7.3.4 Prepare reports as required and recognize anomalies in reported data
- E7.3.5 Provide AM data and information needed to transfer assets to operational use

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# The IAM Diploma in Asset Management

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## Module (D1): Asset management: policy and strategy

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### Summary

An asset management policy is the cornerstone of an organization's approach to asset management. As such it provides both the confidence that the organization is translating its overall organizational strategic plan into an effective asset management plan, and provides the start of an organization's 'line of sight', the golden thread of rationale which ultimately justifies every asset management activity the organization undertakes.

'Line of sight' is an essential concept for effective asset management. The project manager or technician at the 'sharp end' of an organization should be able to trace the rationale for what he or she is doing upwards through a clear set of plans, objectives and strategic statements to something in the organizational strategic plan (that is, the organization's topmost vision). This requires a clear framework within which asset management decision-making is made and presented. The purpose of the asset management policy is to set this framework out.

**Topics to be covered in this Module:** alignment with corporate strategy; role of asset management in corporate governance; the asset management system; key contents of a policy and strategy, development methods, information requirements, roles and responsibilities; and policy and strategy evaluation.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Analyse policy requirements

- E1.1.1 Define the corporate goals the AM Policy must help achieve
- E1.1.2 Define the stakeholder requirements the AM Policy must address
- E1.1.3 Define the opportunities and constraints the AM Policy must take into account
- E1.1.4 Define the stakeholder groups and socio-economic issues the AM Policy must take into account

#### Develop the AM policy

- E1.2.1 Define the decision criteria for selecting amongst Policy options
- E1.2.2 Assess Policy options using appropriate decision criteria
- E1.2.3 Define the AM Policy goals and aspirations
- E1.2.4 Define the implications of the AM Policy for all stakeholders
- E1.2.5 Make effective use of internal and external expertise in the development of AM Policy
- E1.2.6 Make sure stakeholders are engaged in AM Policy development as appropriate

#### Analyse strategic requirements

- E2.1.1 Define the AM Policy aims and objectives the AM Strategy must achieve and support
- E2.1.2 Define all risks the AM Strategy must take into account
- E2.1.3 Define the constraints the AM Strategy must take into account
- E2.1.4 Define the implications of current and forecast asset condition for AM Strategy development
- E2.1.5 Analyse the current and future customer requirements the AM Strategy must take into account
- E2.1.6 Define the legal, social, environmental and economic factors and trends the AM Strategy must take into account

#### Forecast and analyse future user requirements and demands

- E2.1.7 Define the stakeholder groups the AM Strategy must take into account
- E2.2.1 Use effective tools and techniques to analyse current demands
- E2.2.2 Use historical data to support forecasts of demand and costs
- E2.2.3 Use effective tools and techniques to forecast costs and demands
- E2.2.4 Forecast and assess relevant external products and technological developments and the effects of these

#### Develop the AM strategy

- E2.3.1 Define the aims and objectives of the AM Strategy
- E2.3.2 Develop key strategies for the overall system, asset portfolios and/or asset groups that support strategic aims and objectives
- E2.3.3 Define the expected outcomes of all AM strategies
- E2.3.4 Make sure stakeholders are engaged in the strategy development process as appropriate
- E2.3.5 Make effective use of internal and external expertise in strategy development

Plan the implementation of the AM strategy

- E2.4.1 Define, prioritize and optimize the AM Strategy
- E2.4.2 Prepare financial projections using suitable best practice models
- E2.4.3 Prepare business plans using suitable best practice models
- E2.4.4 Define requirements for market research, systems development and management team-building
- E2.4.5 Define how the effectiveness of the AM Strategy will be measured and monitored

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## Module (D2): Planning for effective asset management

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### Summary

The key to making sound asset management decisions is the acquisition of appropriate knowledge and the decision making framework that is in place within an asset management organization. An asset management strategy should be in place which is derived from and consistent with the asset management policies.

Having a consistent asset management strategy and asset management policies provides a stable framework to allow joined-up decision making. The asset management policy provides the overarching principles which are in place to enable the asset management strategy, objectives and plans to be produced and implemented.

**Topics to be covered in this Module:** performance requirements and future demand projections; criticality and risk analysis; whole life costing; Capex and Opex forecasting; work volumes and programmes; alignment with policy and strategy; the asset management plan; implementation, improvement and review.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Analyse policy requirements

- E1.1.1 Define the corporate goals the AM Policy must help achieve
- E1.1.2 Define the stakeholder requirements the AM Policy must address
- E1.1.3 Define the opportunities and constraints the AM Policy must take into account
- E1.1.4 Define the stakeholder groups and socio-economic issues the AM Policy must take into account

#### Develop the AM policy

- E1.2.1 Define the decision criteria for selecting amongst Policy options
- E1.2.2 Assess Policy options using appropriate decision criteria
- E1.2.3 Define the AM Policy goals and aspirations
- E1.2.4 Define the implications of the AM Policy for all stakeholders
- E1.2.5 Make effective use of internal and external expertise in the development of AM Policy
- E1.2.6 Make sure stakeholders are engaged in AM Policy development as appropriate

#### Analyse strategic requirements

- E2.1.1 Define the AM Policy aims and objectives the AM Strategy must achieve and support
- E2.1.2 Define all risks the AM Strategy must take into account
- E2.1.3 Define the constraints the AM Strategy must take into account
- E2.1.4 Define the implications of current and forecast asset condition for AM Strategy development
- E2.1.5 Analyse the current and future customer requirements the AM Strategy must take into account
- E2.1.6 Define the legal, social, environmental and economic factors and trends the AM Strategy must take into account
- E2.1.7 Define the stakeholder groups the AM Strategy must take into account

#### Forecast and analyse future user requirements and demands

- E2.2.1 Use effective tools and techniques to analyse current demands
- E2.2.2 Use historical data to support forecasts of demand and costs
- E2.2.3 Use effective tools and techniques to forecast costs and demands
- E2.2.4 Forecast and assess relevant external products and technological developments and the effects of these

#### Develop the AM strategy

- E2.3.1 Define the aims and objectives of the AM Strategy
- E2.3.2 Develop key strategies for the overall system, asset portfolios and/or asset groups that support strategic aims and objectives
- E2.3.3 Define the expected outcomes of all AM strategies
- E2.3.4 Make sure stakeholders are engaged in the strategy development process as appropriate
- E2.3.5 Make effective use of internal and external expertise in strategy development

Plan the implementation of the AM strategy

- E2.4.1 Define, prioritize and optimize the AM Strategy
- E2.4.2 Prepare financial projections using suitable best practice models
- E2.4.3 Prepare business plans using suitable best practice models
- E2.4.4 Define requirements for market research, systems development and management team-building
- E2.4.5 Define how the effectiveness of the AM Strategy will be measured and monitored

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## Module (D3): Asset related risk

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### Summary

Risk and review is a fundamental component in the development of sustainable asset management decision making. It facilitates the constant and evolving trade-off between performance, cost and risk whilst providing the feedback and review mechanisms to facilitate the adaptation of objectives and evolution of understanding of asset criticality to the delivery of the business aims. Risk and review requires an understanding of the organization's tolerance to risk, in terms of safety, environmental, financial, reputational and performance risk, so that criticality can be appropriately defined and decision making processes informed. The development and ongoing management of stakeholder relations is key to understanding, describing and communicating these tolerances.

In addition to the key role that risk plays in informing asset management decision making, it is also the mechanism by which an organization can prepare for significant events such as: accidents, incidents or the impacts of climate change to ensure that it has appropriate contingency planning in place and mechanisms for assuring business continuity.

Having understood tolerance to risk and thus the role the assets play in terms of criticality to business decision making, it is important to ensure that feedback and review mechanisms are in place and appropriate. A strong understanding of asset performance and asset health informs the evolution of criticality and risk. The investigation of incidents and failures and associated management review processes provide mechanisms to bring together the understanding of asset performance and health in the context of criticality and business objectives, thus ensuring that change is informed and appropriate. Change Management processes provide the necessary control.

Accounting practices provide assurance that the measurement of financial performance is correctly calibrated; and audit provides assurance that everything in the organization is as it should be. Both of these elements providing additional feedback to inform the evolution of the asset management processes across the business.

**Topics to be covered in this Module:** sources of asset related risk; identification of asset related risk; and risk assessment methods and techniques.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Assess and manage risk

- E6.1.1 Define and manage risk management processes and procedures
- E6.2.1 Identify and assess risks arising from AM activities
- E6.2.2 Specify measures and methods for controlling identified risks
- E6.2.3 Identify improvements needed to working practices and procedures
- E6.2.4 Monitor the progress and impact of improvement actions
- E6.2.5 Integrate AM related risk management with organizational risk management systems

#### Assure the quality of AM processes

- E6.2.1 Assure the quality of AM products or processes
- E6.2.2 Identify the reasons for quality assurance problems
- E6.2.3 Plan and implement improvements to the quality of AM processes
- E6.2.4 Evaluate the effectiveness of process improvements

#### Monitor and review progress and performance

- E6.3.1 Assess asset condition and performance against AM strategy and objectives
- E6.3.2 Assess the performance of AM activities against AM strategy and objectives
- E6.3.3 Identify and implement corrective actions
- E6.3.4 Analyse the progress, impact and effectiveness of corrective actions
- E6.3.5 Identify lessons learned and adjust AM Strategy, policies and procedures accordingly

Review and audit compliance with legal, regulatory, ethical and social requirements

- E6.4.1 Identify and monitor relevant legal, regulatory, ethical and social requirements
- E6.4.2 Develop effective policies and procedures to make sure requirements are met
- E6.4.3 Assess the way policies and procedures are put into practice and provide support
- E6.4.4 Audit compliance with relevant legislation and standards
- E6.4.5 Identify and correct any failures to meet requirements
- E6.4.6 Identify reasons where requirements are not met and adjust policies and procedures accordingly

Learn from incidents

- E6.5.1 Investigate root cause of asset or system failures or incidents.
- E6.5.2 Influence investigation of incidents
- E6.5.3 Make effective use of 'lessons learned' information from incidents

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## Module (D4): Asset information

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### Summary

Asset-intensive organizations rely on asset data, information and asset knowledge as key enablers in undertaking both strategic asset management and operational activities. An overall asset information strategy defines the activities an organization will undertake to ensure that its asset information meets current and future requirements. The quality of asset data and knowledge should be assessed, understood and managed in order to ensure that it provides effective support to business decision making and processes.

Since asset knowledge is about understanding, improving asset knowledge may require additional analysis of information and or additional data gathering. It is also particularly important to ensure that knowledge is recorded and disseminated.

**Topics to be covered in this Module:** the asset register; asset data and information requirements, asset classes and data gathering techniques; condition assessment; criticality analysis; data gathering and information management; definition of knowledge standards; asset information systems.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Define asset information standards

- E7.1.1 Specify asset definition standards to provide a common definition of asset attributes
- E7.1.2 Define asset condition standards and measures and specify how these should be used in condition assessment
- E7.1.3 Specify standard definitions of asset defects and failures
- E7.1.4 Specify asset performance management standards
- E7.1.5 Specify standards which contain common definitions for capturing the utilization of assets
- E7.1.6 Specify functionality and service life requirements for all key asset types
- E7.1.7 Verify that asset knowledge standards are consistent with AM Strategy and Plan(s)

#### Specify, select and integrate AM information systems

- E7.2.1 Specify and validate functional and technical requirements of Information Systems needed to support and integrate AM processes.
- E7.2.2 Identify human factor implications of functional, technical and business requirements
- E7.2.3 Define and plan the integration of Information Systems and Tools
- E7.2.4 Demonstrate appropriate use of Information Systems in supporting the delivery of AM Strategy and Plan(s)
- E7.2.5 Make sure AM Information Systems produce relevant usable data in a cost effective manner
- E7.2.6 Monitor the implementation of Information Systems and Tools

#### Make appropriate AM data available for decision making

- E7.3.1 Develop effective and relevant AM data collection criteria and processes
- E7.3.2 Plan and manage the collection, maintenance and updating, storage and dissemination of AM information
- E7.3.3 Process and analyse AM data to provide effective business information as required
- E7.3.4 Prepare reports as required and recognize anomalies in reported data
- E7.3.5 Provide AM data and information needed to transfer assets to operational use

## Module (D5): Life-cycle delivery

### Summary

The life-cycle of a physical asset starts with the decision to acquire or develop new assets as part of the overall corporate strategic plan. Once the decision is made, the assets need to be procured, typically from external suppliers or designed, developed and produced internally. The assets must then be installed, tested and formally commissioned before entering service: it is the operational stage in the life-cycle of any asset that represents the greatest source of revenue and, ultimately, the return on investment for the asset-holder. Thereafter, assets must be maintained, modified or refurbished; and eventually decommissioned and scrapped. Life-cycle delivery takes account of all these stages.

**Topics to be covered in this Module:** acquisition, operation and maintenance, enhancement, renewal and disposal of assets.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Appraise investment options

- E3.1.1 Define criteria for identifying and evaluating investment options
- E3.1.2 Identify investment options for achieving the AM Strategy and AM objectives
- E3.1.3 Analyse the costs, risks and benefits of investment options
- E3.1.4 Select and justify the most appropriate investment options
- E3.1.5 Evaluate detailed investment plans

#### Apply whole life costing principles

- E3.2.1 Identify how costs of AM activities and asset values should be determined
- E3.2.2 Identify appropriate whole life costing models
- E3.2.3 Specify costs for all key stages of the AM lifecycle
- E3.2.4 Develop business cases using unit cost data
- E3.2.5 Make sure appropriate decision support tools are available
- E3.2.6 Define the process for tracking, analysing and verifying unit cost data
- E3.2.7 Update whole life cost calculations when unit costs change
- E3.2.8 Identify improvement actions through periodic unit cost reviews

#### Create and acquire assets

- E3.3.1 Analyse business needs for the creation and/or acquisition of assets based on the requirements of the AM Plan(s)
- E3.3.2 Specify appropriate performance indicators for whole life assessment of asset creation and/or acquisition.
- E3.3.3 Assess the costs, risks and benefits of competing asset creation and/or acquisition options
- E3.3.4 Prioritize investment projects based on their total business impact.
- E3.3.5 Prepare business cases which evaluate the costs, benefits and risks of proposed solutions based on the AM Plan(s).
- E3.3.6 Identify risks in the commissioning process and assess their impact on current operations and AM activities.

#### Plan for contingencies

- E3.4.1 Identify asset related risks
- E3.4.2 Identify potential disruptions to critical AM activities
- E3.4.3 Plan the most appropriate responses to incidents and emergencies
- E3.4.4 Make sure suitable resources are available to respond to incidents and emergencies as planned

## Module (D6): Asset management capability

### Summary

Asset management capability is concerned with ensuring there is a connection between the asset management policy and strategy and the activities and processes that support them; that is, between the boardroom and the operational front line. Effective asset management organizations have a clear vision of what activities can be outsourced and what needs to be kept in-house. They contract and manage their suppliers in ways that reflect strategic objectives for cost, risk and performance management and they develop and manage supplier and contractor capabilities and relationships with long term asset management goals in mind.

Organizations need suitably qualified and experienced staff at all levels: the competences and behaviours of individual members of staff need to match the demands of their roles; and each person should understand the contribution expected of them. A systematic approach to defining competence and behavioural requirements, selecting and developing staff and managing their work is a hallmark of good-practice asset management organizations. Equally, organizational culture is important because it has a profound effect on what people perceive as good and believe is possible, how they behave and how committed they feel. A key role for senior management is proactively to shape organizational cultures, structures, roles and responsibilities that are both conducive to asset management thinking and tailored to their specific asset management goals.

**Topics to be covered in this Module:** asset management competences and leadership; organizational structure, culture and change management; supplier development and management.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Develop and deploy AM people and teams

- E5.1.1 Identify workload volumes required to meet AM Strategy, AM Objectives and AM Plans
- E5.1.2 Specify competence requirements for AM work activities
- E5.1.3 Make sure asset management staff receive the training and development they need
- E5.1.4 Assign suitably competent people and teams to AM work activities
- E5.1.5 Direct and coordinate the activities of AM teams
- E5.1.6 Develop and support the AM performance of colleagues
- E5.1.7 Challenge resource constraints and justify increases

#### Develop and deploy suppliers

- E5.2.1 Identify the criticality of products and services to the AM Strategy, AM Objectives and Plan(s)
- E5.2.2 Define which products and services should be supplied
- E5.2.3 Identify and manage suppliers to support the achievement of AM Strategy, AM Objectives and Plan(s)
- E5.2.4 Specify requirements for supplied products and services
- E5.2.5 Identify appropriate forms of contract, terms and conditions for achieving the AM Strategy, AM Objectives and Plan(s)
- E5.2.6 Develop and improve the capabilities of suppliers as required

#### Develop and manage organizational change

- E5.3.1 Identify how well current organizational structure supports AM strategy, AM Objectives and Plan(s)
- E5.3.2 Identify changes needed to individual roles and responsibilities
- E5.3.3 Identify changes needed to asset management teams
- E5.3.4 Implement changes to organizational structure, teams and individual roles and responsibilities

#### Shape the AM culture

- E5.4.1 Promote the goals and benefits of AM
- E5.4.2 Define the organizational culture needed to achieve AM Strategy, AM Objectives and Plan(s)
- E5.4.3 Plan and implement changes to organizational culture as required
- E5.4.4 Monitor how well organizational culture supports the achievement of AM Strategy, AM Objectives and Plan(s)

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## Module (D7): Performance management, review and improvement

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### Summary

Asset management teams must be properly and adequately trained and in possession of the necessary competences for their tasks: equally, physical assets must be assessed throughout their life-cycle and adjusted, maintained and repaired as required. In addition, there needs to be compliance with legal, regulatory, ethical and social requirements. All of this occurs within the context of the overall strategic plan for the organization.

**Topics to be covered in this Module:** definition and application of asset management measures (outputs, stewardship and organizational capability evaluation of asset management systems)

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Plan the implementation of the AM strategy

- E2.4.1 Define, prioritize and optimize the AM Strategy
- E2.4.2 Prepare financial projections using suitable best practice models
- E2.4.3 Prepare business plans using suitable best practice models
- E2.4.4 Define requirements for market research, systems development and management team-building
- E2.4.5 Define how the effectiveness of the AM Strategy will be measured and monitored

#### Develop and deploy AM people and teams

- E5.1.1 Identify workload volumes required to meet AM Strategy, AM Objectives and AM Plans
- E5.1.2 Specify competence requirements for AM work activities
- E5.1.3 Make sure asset management staff receive the training and development they need
- E5.1.4 Assign suitably competent people and teams to AM work activities
- E5.1.5 Direct and coordinate the activities of AM teams
- E5.1.6 Develop and support the AM performance of colleagues
- E5.1.7 Challenge resource constraints and justify increases

#### Monitor and review progress and performance

- E6.3.1 Assess asset condition and performance against AM strategy and objectives
- E6.3.2 Assess the performance of AM activities against AM strategy and objectives
- E6.3.3 Identify and implement corrective actions
- E6.3.4 Analyse the progress, impact and effectiveness of corrective actions
- E6.3.5 Identify lessons learned and adjust AM Strategy, policies and procedures accordingly

#### Review and audit compliance with legal, regulatory, ethical and social requirements

- E6.4.1 Identify and monitor relevant legal, regulatory, ethical and social requirements
- E6.4.2 Develop effective policies and procedures to make sure requirements are met
- E6.4.3 Assess the way policies and procedures are put into practice and provide support
- E6.4.4 Audit compliance with relevant legislation and standards
- E6.4.5 Identify and correct any failures to meet requirements
- E6.4.6 Identify reasons where requirements are not met and adjust policies and procedures accordingly

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## **Module (D8): Change management**

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### Summary

AM teams must be equipped to plan, implement and manage change at all levels. The culture of the organization must be attuned to the need constantly to question existing systems, practices and procedures, seeking to improve performance of the team and the physical assets; and the outcomes and implications of change must be monitored to ensure that the strategic aims and objectives are being met.

**Topics to be covered in this Module:** implications of asset management thinking and practices for organizational structure and culture; and designing and achieving change.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Develop and deploy AM people and teams

- E5.1.1 Identify workload volumes required to meet AM Strategy, AM Objectives and AM Plans
- E5.1.2 Specify competence requirements for AM work activities
- E5.1.3 Make sure asset management staff receive the training and development they need
- E5.1.4 Assign suitably competent people and teams to AM work activities
- E5.1.5 Direct and coordinate the activities of AM teams
- E5.1.6 Develop and support the AM performance of colleagues
- E5.1.7 Challenge resource constraints and justify increases

#### Develop and manage organizational change

- E5.3.1 Identify how well current organizational structure supports AM strategy, AM Objectives and Plan(s)
- E5.3.2 Identify changes needed to individual roles and responsibilities
- E5.3.3 Identify changes needed to asset management teams
- E5.3.4 Implement changes to organizational structure, teams and individual roles and responsibilities

#### Shape the AM culture

- E5.4.1 Promote the goals and benefits of AM
- E5.4.2 Define the organizational culture needed to achieve AM Strategy, AM Objectives and Plan(s)
- E5.4.3 Plan and implement changes to organizational culture as required
- E5.4.4 Monitor how well organizational culture supports the achievement of AM Strategy, AM Objectives and Plan(s)

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## Module (D9): Contractor and supply management

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### Summary

The acquisition, operation, maintenance, repair and ultimate disposal of assets will generally require the services of external service contractors and suppliers. Selecting when to use external sources and justifying and supporting the business case for doing so are critically important, as is management of the supply chains thus established. Ensuring that terms and conditions for the supply of goods and services are satisfactory and meet the organization's strategic and policy aims and objectives is therefore a fundamental requirement.

**Topics to be covered in this Module:** implications of asset management for supply chain management; and engaging and developing contractors and suppliers.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Analyse policy requirements

- E1.1.1 Define the corporate goals the AM Policy must help achieve
- E1.1.2 Define the stakeholder requirements the AM Policy must address
- E1.1.3 Define the opportunities and constraints the AM Policy must take into account
- E1.1.4 Define the stakeholder groups and socio-economic issues the AM Policy must take into account

#### Plan the implementation of the AM strategy

- E2.4.1 Define, prioritize and optimize the AM Strategy
- E2.4.2 Prepare financial projections using suitable best practice models
- E2.4.3 Prepare business plans using suitable best practice models
- E2.4.4 Define requirements for market research, systems development and management team-building
- E2.4.5 Define how the effectiveness of the AM Strategy will be measured and monitored

#### Create and acquire assets

- E3.3.1 Analyse business needs for the creation and/or acquisition of assets based on the requirements of the AM Plan(s)
- E3.3.2 Specify appropriate performance indicators for whole life assessment of asset creation and/or acquisition.
- E3.3.3 Assess the costs, risks and benefits of competing asset creation and/or acquisition options
- E3.3.4 Prioritize investment projects based on their total business impact.
- E3.3.5 Prepare business cases which evaluate the costs, benefits and risks of proposed solutions based on the AM Plan(s).
- E3.3.6 Identify risks in the commissioning process and assess their impact on current operations and AM activities.

#### Develop and deploy suppliers

- E5.2.1 Identify the criticality of products and services to the AM Strategy, AM Objectives and Plan(s)
- E5.2.2 Define which products and services should be supplied
- E5.2.3 Identify and manage suppliers to support the achievement of AM Strategy, AM Objectives and Plan(s)
- E5.2.4 Specify requirements for supplied products and services
- E5.2.5 Identify appropriate forms of contract, terms and conditions for achieving the AM Strategy, AM Objectives and Plan(s)
- E5.2.6 Develop and improve the capabilities of suppliers as required

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## Module (D10): Asset life-cycle and delivery

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### Summary

Assets will be acquired or produced in accordance with the strategic and business plans of the organization. In doing so, the financial implications must be assessed to ensure that capital investment is timely and appropriate, including consideration of whole-life costings. Thereafter the assets must be installed, operated, maintained, refurbished and repaired and, ultimately decommissioned and scrapped: performance throughout the operational life-cycle must be monitored and adjusted as necessary.

**Topics to be covered in this Module:** controlling cost and risk through the asset lifecycle; minimising whole life cost; and Capex/Opex trade-offs.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Appraise investment options

- E3.1.1 Define criteria for identifying and evaluating investment options
- E3.1.2 Identify investment options for achieving the AM Strategy and AM objectives
- E3.1.3 Analyse the costs, risks and benefits of investment options
- E3.1.4 Select and justify the most appropriate investment options
- E3.1.5 Evaluate detailed investment plans

#### Apply whole life costing principles

- E3.2.1 Identify how costs of AM activities and asset values should be determined
- E3.2.2 Identify appropriate whole life costing models
- E3.2.3 Specify costs for all key stages of the AM lifecycle
- E3.2.4 Develop business cases using unit cost data
- E3.2.5 Make sure appropriate decision support tools are available
- E3.2.6 Define the process for tracking, analysing and verifying unit cost data
- E3.2.7 Update whole life cost calculations when unit costs change
- E3.2.8 Identify improvement actions through periodic unit cost reviews

#### Create and acquire assets

- E3.3.1 Analyse business needs for the creation and/or acquisition of assets based on the requirements of the AM Plan(s)
- E3.3.2 Specify appropriate performance indicators for whole life assessment of asset creation and/or acquisition.
- E3.3.3 Assess the costs, risks and benefits of competing asset creation and/or acquisition options
- E3.3.4 Prioritize investment projects based on their total business impact.
- E3.3.5 Prepare business cases which evaluate the costs, benefits and risks of proposed solutions based on the AM Plan(s).
- E3.3.6 Identify risks in the commissioning process and assess their impact on current operations and AM activities.

#### Plan for contingencies

- E3.4.1 Identify asset related risks
- E3.4.2 Identify potential disruptions to critical AM activities
- E3.4.3 Plan the most appropriate responses to incidents and emergencies
- E3.4.4 Make sure suitable resources are available to respond to incidents and emergencies as planned

#### Control operations

- E4.1.1 Develop risk based implementation plans and objectives in line with operations, maintenance and/or refurbishment strategy
- E4.1.2 Review and update existing operations strategy
- E4.1.3 Develop operations work and resource plans
- E4.1.4 Develop and evaluate work management processes
- E4.1.5 Manage the delivery of workplans including managing changes and the impact of unplanned work

Maintain assets

- E4.2.1 Review and update existing maintenance and/or refurbishment strategies
- E4.2.2 Develop risk based maintenance and /or refurbishment workplans
- E4.2.3 Specify spares management and inventory requirements
- E4.2.4 Plan the distribution of spares and supplies
- E4.2.5 Identify appropriate condition assessment techniques
- E4.2.6 Assess asset condition and performance and modify maintenance plans and regimes as required
- E4.2.7 Evaluate options for extending the life of assets

Optimize and rationalize assets

- E4.3.1 Review asset performance and capacity against current requirements to identify proposals for rationalization of assets
- E4.3.2 Evaluate asset rationalization within a cost-risk optimization framework
- E4.3.3 Make sure rationalization projects are fully defined and assessed including their impact on other potential projects
- E4.3.4 Make sure rationalization projects are implemented and are subject to full post-investment appraisals
- E4.3.5 Make sure the spares management process supports the AM Strategy and Plan(s)

Renew or dispose of assets

- E4.4.1 Select and justify the optimal strategy based on AM Strategy
- E4.4.2 Identify and plan life-extending, decommissioning, disposal and risk control actions.
- E4.4.3 Manage the implementation of life-extending, decommissioning, disposal and risk control actions
- E4.4.4 Evaluate the effectiveness of life-extending, decommissioning, disposal and risk control actions
- E4.4.5 Make sure assets are disposed of responsibly and ethically

Assess and manage risks

- E6.1.1 Define and manage risk management processes and procedures
- E6.1.2 Identify and assess risks arising from AM activities
- E6.1.3 Specify measures and methods for controlling identified risks
- E6.1.4 Identify improvements needed to working practices and procedures
- E6.1.5 Monitor the progress and impact of improvement actions
- E6.1.6 Integrate AM related risk management with organizational risk management systems

Monitor and review progress and performance

- E6.3.1 Assess asset condition and performance against AM strategy and objectives
- E6.3.2 Assess the performance of AM activities against AM strategy and objectives
- E6.3.3 Identify and implement corrective actions
- E6.3.4 Analyse the progress, impact and effectiveness of corrective actions
- E6.3.5 Identify lessons learned and adjust AM Strategy, policies and procedures accordingly

Learn from incidents

- E6.5.1 Investigate root cause of asset or system failures or incidents.
- E6.5.2 Influence investigation of incidents
- E6.5.3 Make effective use of 'lessons learned' information from incidents

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## Module (D11): Sustainability

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### Summary

Sustainable development highlights the need for consideration to be given to apply long-term perspectives to current asset management activities and their potential impacts. Underpinning the requirement for sustainable development is recognition of the need to safeguard the interests of future generations over the long-term, while promoting short-term economic and environmental stability.

Sustainable development involves considering environmental, social and economic aspects. Rather than trading off one factor against another, all three factors should be optimized in the decision-making process. So, a sustainable development review within an organization has to be supported by the broader asset management strategy, policies and risk management framework.

**Topics to be covered in this Module:** modelling and projecting energy costs and carbon emissions; and using asset management to deliver and demonstrate environmental and social benefits.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Analyse policy requirements

- E1.1.1 Define the corporate goals the AM Policy must help achieve
- E1.1.2 Define the stakeholder requirements the AM Policy must address
- E1.1.3 Define the opportunities and constraints the AM Policy must take into account
- E1.1.4 Define the stakeholder groups and socio-economic issues the AM Policy must take

#### Review and audit compliance with legal, regulatory, ethical and social requirements

- E6.4.1 Identify and monitor relevant legal, regulatory, ethical and social requirements
- E6.4.2 Develop effective policies and procedures to make sure requirements are met
- E6.4.3 Assess the way policies and procedures are put into practice and provide support
- E6.4.4 Audit compliance with relevant legislation and standards
- E6.4.5 Identify and correct any failures to meet requirements
- E6.4.6 Identify reasons where requirements are not met and adjust policies and procedures accordingly

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## **Module (D12): Demand forecasting**

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### Summary

The need and ability to anticipate, and then meet, future requirements and demands are strategic and operational requirements. Using appropriate tools and techniques to analyse current demands and thus predict future demands and costs, and the associated risks, are key aspects of the process.

**Topics to be covered in this Module:** future demand forecasting; sources and types of data; forecasting methods; dealing with uncertainty.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Forecast and analyse future user requirements and demands

- E2.2.1 Use effective tools and techniques to analyse current demands
- E2.2.2 Use historical data to support forecasts of demand and costs
- E2.2.3 Use effective tools and techniques to forecast costs and demands
- E2.2.4 Forecast and assess relevant external products and technological developments and the effects of these

#### Appraise investment options

- E3.1.1 Define criteria for identifying and evaluating investment options
- E3.1.2 Identify investment options for achieving the AM Strategy and AM objectives
- E3.1.3 Analyse the costs, risks and benefits of investment options
- E3.1.4 Select and justify the most appropriate investment options
- E3.1.5 Evaluate detailed investment plans

#### Assess and manage risks

- E6.1.1 Define and manage risk management processes and procedures
- E6.1.2 Identify and assess risks arising from AM activities
- E6.1.3 Specify measures and methods for controlling identified risks
- E6.1.4 Identify improvements needed to working practices and procedures
- E6.1.5 Monitor the progress and impact of improvement actions
- E6.1.6 Integrate AM related risk management with organizational risk management systems

#### Monitor and review progress and performance

- E6.3.1 Assess asset condition and performance against AM strategy and objectives
- E6.3.2 Assess the performance of AM activities against AM strategy and objectives
- E6.3.3 Identify and implement corrective actions
- E6.3.4 Analyse the progress, impact and effectiveness of corrective actions
- E6.3.5 Identify lessons learned and adjust AM Strategy, policies and procedures accordingly

## Module (D13): Whole-life costing

### Summary

Having decided to invest in assets, an organization must have the ability to determine the anticipated costs of acquisition, installation, operation, maintenance, refurbishment and repair for the intended asset lifetime. There is thus a requirement to appraise investment options, plan for contingencies and assess and manage risks in addition to applying whole-life costing principles; and progress and performance must be monitored.

**Topics to be covered in this Module:** whole life cost components; modelling techniques and methods; sensitivity analysis; and whole-life cost optimization.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Forecast and analyse future user requirements and demands

- E2.1.1 Define the AM Policy aims and objectives the AM Strategy must achieve and support
- E2.1.2 Define all risks the AM Strategy must take into account
- E2.1.3 Define the constraints the AM Strategy must take into account
- E2.1.4 Define the implications of current and forecast asset condition for AM Strategy development
- E2.1.5 Analyse the current and future customer requirements the AM Strategy must take into account
- E2.1.6 Define the legal, social, environmental and economic factors and trends the AM Strategy must take into account
- E2.1.7 Define the stakeholder groups the AM Strategy must take into account

#### Appraise investment options

- E3.1.1 Define criteria for identifying and evaluating investment options
- E3.1.2 Identify investment options for achieving the AM Strategy and AM objectives
- E3.1.3 Analyse the costs, risks and benefits of investment options
- E3.1.4 Select and justify the most appropriate investment options
- E3.1.5 Evaluate detailed investment plans

#### Apply whole life costing principles

- E3.2.1 Identify how costs of AM activities and asset values should be determined
- E3.2.2 Identify appropriate whole life costing models
- E3.2.3 Specify costs for all key stages of the AM lifecycle
- E3.2.4 Develop business cases using unit cost data
- E3.2.5 Make sure appropriate decision support tools are available
- E3.2.6 Define the process for tracking, analysing and verifying unit cost data
- E3.2.7 Update whole life cost calculations when unit costs change
- E3.2.8 Identify improvement actions through periodic unit cost reviews

#### Plan for contingencies

- E3.4.1 Identify asset related risks
- E3.4.2 Identify potential disruptions to critical AM activities
- E3.4.3 Plan the most appropriate responses to incidents and emergencies
- E3.4.4 Make sure suitable resources are available to respond to incidents and emergencies as planned

#### Assess and manage risks

- E6.1.1 Define and manage risk management processes and procedures
- E6.1.2 Identify and assess risks arising from AM activities
- E6.1.3 Specify measures and methods for controlling identified risks
- E6.1.4 Identify improvements needed to working practices and procedures
- E6.1.5 Monitor the progress and impact of improvement actions
- E6.1.6 Integrate AM related risk management with organizational risk management systems

#### Monitor and review progress and performance

- E6.3.1 Assess asset condition and performance against AM strategy and objectives
- E6.3.2 Assess the performance of AM activities against AM strategy and objectives
- E6.3.3 Identify and implement corrective actions
- E6.3.4 Analyse the progress, impact and effectiveness of corrective actions
- E6.3.5 Identify lessons learned and adjust AM Strategy, policies and procedures accordingly

## Module (D14): Asset management knowledge systems

### Summary

Asset data, information and asset knowledge are key requirements for both strategic asset management and operational activities and an overall asset information strategy will define the activities an organization should undertake to ensure that its asset information meets current and future requirements. Asset Information Standards are used to define explicitly the data and information required, its format, who should provide it and when it shall be provided. Software systems, or applications, may be used to automate asset management processes and to provide consistent decision-support analysis: asset information is typically an input to such processes and this information may itself be modified or created by the process and will be an output of the process.

The quality of asset data and knowledge should be assessed, understood and managed in order to ensure that it provides effective support to business decision making and processes.

**Topics to be covered in this Module:** role and definition of knowledge standards; specification of information requirements and systems; building an asset information system; integration of legacy systems; data quality issues.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Define asset information standards

- E7.1.1 Specify asset definition standards to provide a common definition of asset attributes
- E7.1.2 Define asset condition standards and measures and specify how these should be used in condition assessment
- E7.1.3 Specify standard definitions of asset defects and failures
- E7.1.4 Specify asset performance management standards
- E7.1.5 Specify standards which contain common definitions for capturing the utilization of assets
- E7.1.6 Specify functionality and service life requirements for all key asset types
- E7.1.7 Verify that asset knowledge standards are consistent with AM Strategy and Plan(s)

#### Specify, select and integrate AM information systems

- E7.2.1 Specify and validate functional and technical requirements of Information Systems needed to support and integrate AM processes.
- E7.2.2 Identify human factor implications of functional, technical and business requirements
- E7.2.3 Define and plan the integration of Information Systems and Tools
- E7.2.4 Demonstrate appropriate use of Information Systems in supporting the delivery of AM Strategy and Plan(s)
- E7.2.5 Make sure AM Information Systems produce relevant usable data in a cost effective manner
- E7.2.6 Monitor the implementation of Information Systems and Tools

#### Make appropriate AM data available for decision making

- E7.3.1 Develop effective and relevant AM data collection criteria and processes
- E7.3.2 Plan and manage the collection, maintenance and updating, storage and dissemination of AM information
- E7.3.3 Process and analyse AM data to provide effective business information as required
- E7.3.4 Prepare reports as required and recognize anomalies in reported data
- E7.3.5 Provide AM data and information needed to transfer assets to operational use

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## Module (D15): Capital expenditure planning

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### Summary

Investments in capital assets will be taken in the context of the strategic and policy requirements of the organization. In selecting assets for acquisition or internal development, consideration must be given to the various options available, the risks associated with acquisition or development and subsequent life-cycle operations, and the anticipated, associated costs and benefits.

**Topics to be covered in this Module:** modelling and verifying capital expenditure requirements; impact of capital expenditure on operational expenditure and business profitability; and planning and forecasting techniques and processes.

### Proposed requirements for 'evidence of competence'

*(sub-headings, numbering and specifications derived from the IAM Competence Framework)*

#### Analyse policy requirements

- E1.1.1 Define the corporate goals the AM Policy must help achieve
- E1.1.2 Define the stakeholder requirements the AM Policy must address
- E1.1.3 Define the opportunities and constraints the AM Policy must take into account
- E1.1.4 Define the stakeholder groups and socio-economic issues the AM Policy must take into account

#### Analyse strategic requirements

- E2.1.1 Define the AM Policy aims and objectives the AM Strategy must achieve and support
- E2.1.2 Define all risks the AM Strategy must take into account
- E2.1.3 Define the constraints the AM Strategy must take into account
- E2.1.4 Define the implications of current and forecast asset condition for AM Strategy development
- E2.1.5 Analyse the current and future customer requirements the AM Strategy must take into account
- E2.1.6 Define the legal, social, environmental and economic factors and trends the AM Strategy must take into account
- E2.1.7 Define the stakeholder groups the AM Strategy must take into account

#### Appraise investment options

- E3.1.1 Define criteria for identifying and evaluating investment options
- E3.1.2 Identify investment options for achieving the AM Strategy and AM objectives
- E3.1.3 Analyse the costs, risks and benefits of investment options
- E3.1.4 Select and justify the most appropriate investment options
- E3.1.5 Evaluate detailed investment plans

#### Assess and manage risks

- E6.1.1 Define and manage risk management processes and procedures
- E6.1.2 Identify and assess risks arising from AM activities
- E6.1.3 Specify measures and methods for controlling identified risks
- E6.1.4 Identify improvements needed to working practices and procedures
- E6.1.5 Monitor the progress and impact of improvement actions
- E6.1.6 Integrate AM related risk management with organizational risk management systems