

# EXPRO National Manual of Assets and Facilities Management

## Volume 2, Chapter 2

### Continuous Improvement

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## Continuous Improvement

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## 1.0 PURPOSE

This document provides FM staff with an understanding of Asset Management related factors, which contribute to achieving and sustaining continuous improvement within respective entities. It is designed to be scalable dependent on variables such as:

- The size of the Entity to which it is applied.
- The level of Asset Management maturity attained, and practiced by the Entity.
- The capability and experience of the Asset Management practitioners, operating within each Entity.

The guidelines contained herein shall assist the Entity in defining and refining, its Asset Management strategy.

## 2.0 SCOPE

The scope of this document is to ensure that each Entity holds sufficient information such that it can create continuous improvement within its Asset Management System. It is applicable to all Entities that have adopted an Asset Management System and are striving to continually improve the System components (e.g. Policy, Plans, and Procedures).

While all FM staff should have an awareness of the contents of this document, guidance is specifically relevant to Asset Management practitioners and other stakeholders within the Entity (i.e. Service Providers, and those responsible for defining and approving the Asset Management strategy).

## 3.0 DEFINITIONS

Term	Definition
Asset Management	The coordinated activity of an organization to realize the full potential of any asset
Asset Management System	Set of interrelated or interacting elements to establish Asset Management Policy, Asset Management Objective and processes to achieve those objectives. (i.e. management systems for the management of assets).
Asset Management Policy	A statement that sets out the principles by which the organization intends to apply the Asset Management System, to achieve its organizational objectives.
Asset Management Objective	Derived as part of the SAMP are the aligned activities set by the Entity, and consistent with Organizational Objectives and Asset Management Policy, to achieve specific measurable results. It provides the essential link between the organizational objective and the Asset Management Plan (AMP) that describes how those objectives are to be achieved.
Asset Lifecycle	The phases an Asset transitions through, from inception to disposal.
Asset Management Process	The method used to implement an Asset Management System.
Abbreviations	
AMP	Asset Management Plan – Documented information that specifies the activities, resources and timescales required for an individual Asset, or a grouping of assets, to achieve the organization's Asset Management Objectives, in the short to medium term
AR	Asset Register – A list of all assets containing pertinent details about each asset to track the value, physical location, operating cost, condition, utilization, and all other details necessary to better manage the asset
CA	Condition Assessment – The process of periodic physical inspections, assessments, measurements and interpretation of the resultant data to indicate the condition of a specific asset
SAMP	Strategic Asset Management Plan – Documented information which defines:



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Term	Definition
	<ul style="list-style-type: none"><li>• How organizational objectives are to be converted into Asset Management Objectives</li><li>• The approach for developing Asset Management Plans</li><li>• The role of the Asset Management System in supporting achievement of long-term Asset Management Objectives</li></ul>
SLA	Service Level Agreement – Performance Contract signed between the Entity and Service Providers

**Table 1: Definitions**

### 4.0 REFERENCES

- International Standards Organization (ISO) 55000:2014 – Asset Management, Overview, Principles and Terminology
- ISO 55001:2014 – Asset Management, Management Systems – Requirements
- ISO 55002:2014 – Asset Management, Management Systems – Guidelines for the application of ISO 55001
- ISO 41001:2018 – Facility Management, Management Systems — Requirements with Guidance for Use
- ISO/TS 55010:2019 Asset Management – Guidance on the Alignment of Financial and Non-Financial Functions in Asset Management
- ISO 9000:2015 – Quality Management Systems



## 5.0 RESPONSIBILITIES

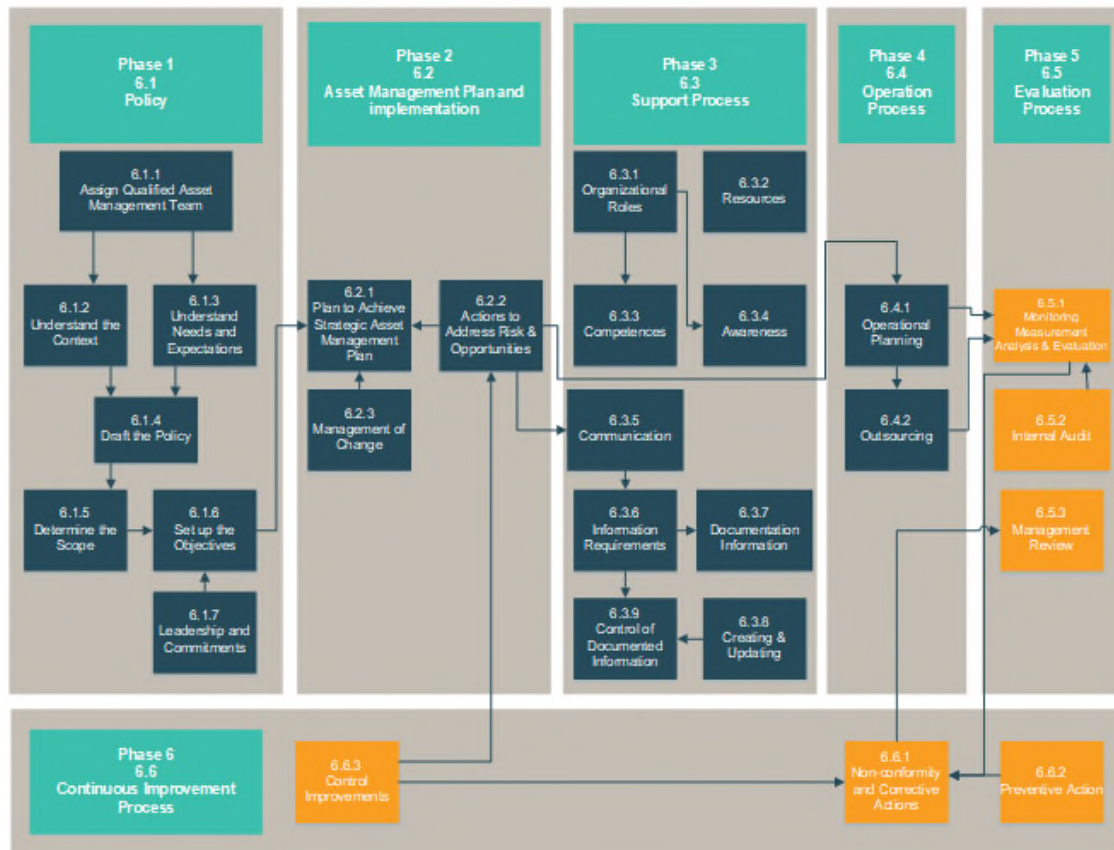
Role	Description
Asset Management Function	<p>An Asset Management function shall be established within the Entity and mandated by Entity Leadership to develop and implement an effective Asset Management System for the Entity. Responsibilities undertaken by the Entity include, but are not limited to the following:</p> <ul style="list-style-type: none"><li>• Developing, deploying, and monitoring the Asset Management System</li><li>• Establish standards and performance measures for the Asset Management System</li><li>• Suitably identifying, controlling, and mitigating hazards which affect the Asset Management System</li><li>• Establish the impact of future requirements on the Asset Management System</li><li>• Planning and managing a program of Condition Assessments (CA), as necessary in line with the guidelines laid out within National Manual for Assets and Facilities Management (NMA&amp;FM) – Volume 3.<ul style="list-style-type: none"><li>◦ Manage compilation of an Asset Condition Assessment Report</li><li>◦ Manage the establishment of an Asset Hierarchy, including criticality of assets</li><li>◦ Plan and implement recommendations established by the Condition Assessment Report</li></ul></li><li>• Sourcing appropriate Asset Management practitioners to formulate the Entity's Asset Management Team</li><li>• Training and briefing of personnel as applicable, such that the Asset Management System can be successfully developed, deployed, and maintained</li><li>• Managing data quality such that information derived from the data is used to inform the Asset Management Strategy, and support intelligent decision-making, regarding the Entity's Assets</li></ul>
Service Providers	<p>Responsibilities which are likely to be outsourced to Service Providers are as follows:</p> <ul style="list-style-type: none"><li>• Collaborate with the Entity to develop an Asset Management Policy</li><li>• Develop Asset Management System requirements</li><li>• Develop the Entity's Asset Management System such that it meets the Entity's existing, and future needs</li><li>• Successfully undertake Change Management such that Entity operations are not negatively impacted by change processes</li><li>• Train Entity personnel to support the implementation of the Asset Management System</li><li>• Effectively Manage Risk (i.e. through Risk Assessments and Method Statements – RAMS)</li><li>• Deliver a program of Condition Assessments (CA), including:<ul style="list-style-type: none"><li>◦ Compilation of an Asset Condition Assessment Report</li><li>◦ Establishing an Asset Hierarchy (showing criticality of assets based on data provided by the Entity)</li></ul></li></ul>

**Table 2: Responsibilities**



## 6.0 PROCESS

Establishment of the Asset Management System shall follow the process outlined within Figure 1, below. The process features 6 phases. The continuous improvement component of the process highlighted within the diagram shall be explained within subsequent sections.



**Figure 1: Establishing an Asset Management System**

### 6.1 Policy

Details regarding this component are outlined within Volume 2, Chapter 2 of the NMA&FM – Policy and Planning.

### 6.2 Asset Management Planning and Implementation

Details regarding this component are also outlined within Volume 2, Chapter 2 of the NMA&FM – Policy and Planning.

### 6.3 Asset Management Support Processes

Details regarding this component are outlined within Volume 2, Chapter 3 of the NMA&FM – Asset Management Systems.

### 6.4 Asset Operation Process

Details regarding this component are outlined throughout Volume 5 of the NMA&FM – Operations Management.





### 6.5 Evaluation Process

Monitoring and evaluation offer the opportunity to confirm satisfactory performance through assessment of Key Performance Indicators (KPIs). It also provides opportunities for improvement. Therefore, the purpose of the Evaluation Process is to ensure that desired outcomes and objectives associated with the Asset Management System and associated Policy, are successfully achieved.

Under the Evaluation Process there are procedures aimed at continuously improving the Asset Management System. Guidance regarding such procedures is contained within this section.

#### 6.5.1 Monitoring, Measurement, Analysis & Evaluation

Guidance associated with monitoring, measurement, analysis, and evaluation are featured throughout the NMA&FM as outlined in Table 3 (below).

Requirement	Relevant Component of the NMA&FM
Determine which Assets shall be monitored, and which aspects of the Asset Management Systems shall be measured	Volume 2, Chapter 3 – Asset Management Systems
Determine appropriate methods for monitoring, measurement, analyses, and evaluation, as applicable, to ensure valid results	Volume 11, Chapter 3 – Quality Assurance Audits
Determine when monitoring and measuring shall be performed	Volume 15 – Performance Monitoring
Determine when and how results from monitoring and measurement activities shall be evaluated	Volume 15 – Performance Monitoring

**Table 3: Monitoring, Measurement, Analysis, and Evaluation Components of the NMA&FM**

The Entity shall determine each of the requirements as outlined within Table 3 (above), through reference to the relevant chapters of the NMA&FM.

The Asset Management System shall trend data obtained through monitoring and measurement activities, resulting in coherent information regarding asset performance. Such information shall be used to make evidence-based decisions. For example:

- Evaluate whether the Entity's Asset Management Policy and associated objectives of the Asset Management Strategy are being achieved.
- Identify corrective actions,
- Highlight areas of improvement.

Performance of activities outsourced to Service Providers shall also be monitored based on inputs such as: reported results, audits performed by the Entity, and external audit reports, such as risk practices, QA/QC etc.

#### 6.5.2 Developing Procedures

In developing procedures for the systematic measurement, monitoring, analysis and evaluation of the Entity's Assets, the Entity should:

- Set performance metrics and associated KPIs, such as condition or capacity indicators.
- Set up a Governance Framework which verifies and assures compliance with Saudi Law, local regulations, standards, and best-practices.
- Examine historical evidence (e.g. Asset Condition Assessment Reports, and Maintenance history).



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### 6.5.2.1 Assessing the Performance of Asset Management Processes, Procedures and Functions

The Entity shall establish qualitative, quantitative, financial, and non-financial KPIs governing the Asset Management System, which are:

- Proactive – such as dispatch, loading, capacity, or condition indicators
- Reactive – such as failures, incidents, non-conformities (including near misses and false alarms) and other historical evidence of deficiencies in performance

In establishing KPIs, the Entity should consider the relationship between each KPI, such that no conflicts arise. Selection of KPIs shall consider aspects such as:

- Extent of Asset Functions
- Required Deliverables throughout Asset Lifecycle
- Historical Upgrades and Replacements
- Maintenance Records and Failures
- Financial Budgets
- Risks

KPIs shall be arranged in sequence, and shall be result-oriented to cover all expected outcomes (i.e. KPIs should be scalable).

### 6.5.2.2 Assessing Performance of the Asset Portfolio

The Entity shall draw a correlation between financial and technical parameters of each asset through means such as:

- Shared set of Classification Systems
- Shared Hierarchical Structures
- A common understanding of how asset portfolios, asset systems and individual assets are broken down for lifecycle management purposes.

The change in future value of the assets and the risk profile should be evaluated in both a financial context and a non-financial context (Refer to Volume 4, Chapter 1 of the NMA&FM – Financial Planning Procedure (EOM-ZLO-GL-000001)).

The monitoring and assessment of the asset portfolio shall be executed at a level suitable to the risk, complexity, and value of each asset.

### 6.5.3 Internal Audit

Internal audits shall be undertaken by the Entity as part of continuous improvement. The outcomes of internal auditing in relation to Asset Management include, for example, understanding to what extent:

- Existing Asset Management practices comply with the Asset Management Policy
- Existing Asset Management practices support or detract from objectives of the Asset Management Strategy
- Service Providers are performing in line with obligations set out within Service Level Agreements (SLAs)

Types of internal audit include:

- Horizontal Audit – Examines compliance of a specific process across departments falling under the Asset Management System, against compliance criteria and thresholds
- Vertical Audit – Examines one department against compliance criteria and thresholds

The methodology which shall be employed when undertaking audits shall comply with:

- All requirements set out within this document
- All requirements set out within NMA&FM Volume 11, Chapter 3 – Quality Assurance Audits



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### 6.5.3.1 Audit Planning

A systematic program of internal auditing, including outcomes, shall be clearly documented, monitored, and trended. An Audit Plan, Report Templates, and Check Lists shall be prepared by the Entity, and Auditors shall be trained in the use of the documentation.

The Audit Plan shall detail key information such as:

- Frequency of audits
- Assets and people involved in the audit
- Audit locations
- Dates

In planning the audit, the Auditor shall refer to the previous audit to understand which areas were audited, identify previous actions, and plan the next audit – this includes following up on remedial actions.

### 6.5.3.2 Auditor Requirements

Personnel from across the Entity (irrespective of department or role), shall be trained in the ability to carry out internal audits. Internal audits associated with the Asset Management System can be undertaken by any member of an Entity's staff, with suitable knowledge of the Asset Management Policy and Strategy. However, preference shall be given to those with relevant experience and suitable qualifications (e.g. Institute of Asset Management Certification). Internal Auditors shall also possess a suitable level of Health and Safety awareness (i.e. the ability to identify Risks and mitigations, along with reporting requirements and remedial actions). The Auditor should always be accompanied by either the Facility Manager or the Operational Supervisor, to ensure that issues are identified, endorsed, and validated.

Other FM staff, such as Operations and Maintenance (O&M) personnel should also be engaged in the audit process, such that staff can understand areas of non-compliance, their role in the Evaluation Process, and subsequent Continuous Improvement Processes.

### 6.5.3.3 Reporting

Audit Reports shall be collated and submitted for Management Review. Reports shall feature a result, based on compliance thresholds set by the Entity. For example:

- In-Compliance
- Observation with a Chance for Improvement
- Non-Compliance

Each Audit Report shall define gaps in compliance, and outline corrective actions.

In addition to internal audits, entities should be subject to external audits, as required. For example, when pursuing independent certification from an external body. External audits shall be conducted by a qualified Auditor who is not employed by the Entity, or by a Service Provider.

### 6.5.4 Management Review

The Entity Management shall review the Entity's Asset Management System at planned intervals, to ensure its continuing suitability, adequacy, and effectiveness. Management Review shall include:

- The status of actions from previous management reviews
- Review of Asset Management Policy, Objectives, and Plans
- Internal and external changes relevant to the Asset Management System
- Opportunities for continuous improvement
- Changes in the profile of risks and opportunities
- Information related to Asset performance, including trends in:
  - Non-conformities
  - Corrective actions
  - System performance



- Audit results

The outputs of the Management Review shall include decisions related to continuous improvement opportunities and any need for changes to the Asset Management System. Management Reviews shall be recorded in the form of Meeting Minutes, and actions assigned to relevant members of the Entity's Management.

### 6.6 Continuous Improvement Process

The Continuous Improvement Process component of the Asset Management System follows on from the Evaluation Process. It features 3 key components:

- Non-conformity and Corrective Actions
- Preventive Action
- Control Improvements

This section describes each of these components.

#### 6.6.1 Non-conformity and Corrective Actions

Non-conformities (including incidents and failures), can affect any part of the Asset Management System (including Policy, Procedure, Plan, Process) or indeed the Asset itself.

##### **Incident Reporting**

The Entity shall establish an incident reporting procedure which captures non-conformities and associated consequences. The establishment of a robust incident reporting procedure will minimize adverse effects of non-conformities upon the Entity and its stakeholders. The incident reporting procedure should be informed by reviewing data and reporting concerning past non-conformities, evaluating how the consequences were addressed, and determining methodologies to prevent future non-conformity.

When a non-conformity is discovered within the Entity's Asset Management System, the Entity shall take the following actions:

- Address immediate concerns. For example, those which pose a risk to:
  - People
  - Environment
  - Entity Operations
  - Critical Assets
- Review each case incident or chain of related incidents and resulting non-conformities
- Undertake Root Cause Analysis
- Determine the likelihood that similar non-conformities may occur
- Implement corrective actions
- Review the effectiveness of corrective actions taken
- Make changes to the Asset Management System, as necessary

##### **Corrective Actions**

Prior to implementing corrective actions, the Entity shall establish and maintain procedures for instigating corrective actions. Such procedures shall feature robust commercial and technical governance, such that assets, operations, finances, people, and the environment, are suitably protected from the consequences of implementing corrective actions.

Procedures for instigating corrective actions shall include, at a minimum:

- Carry out a Risk Assessment
- Record the time at which the corrective action was initiated and closed out
- Monitor and record the effectiveness of the corrective action
- Follow Change Management guidelines stipulated within the Asset Management System



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For Asset Management activities which are outsourced to Service Providers, the process of incident reporting and implementing corrective actions shall be considered within the context of the SLA.

### 6.6.2 Preventive Action

Preventive actions (including predictive actions), are those taken to address the root cause of potential failures or incidents, as a proactive measure, before such incidents occur. The Entity shall take proactive measures in identifying potential non-conformances. Such measures should include, for example, establishment of a dashboard to monitor live KPIs, featuring alarms set against performance thresholds.

Procedures for instigating preventive actions shall include, as a minimum:

- The use of reliable and appropriate sources of information
- Means of identification potential failures
- Use of an appropriate and consistent methodology
- Extensive recording of changes in processes and procedures resulting from the preventive action
- Assessment of existing preventive action methodologies
- Input to Asset Management Plans arising from preventive actions

For Asset Management activities which are outsourced to Service Providers, the process of implementing preventive actions shall be considered within the context of the SLA.

### 6.6.3 Control Improvements

Continuous improvement is an ongoing activity with the ultimate aim of continually delivering to the objectives set out within the Entity's Asset Management Strategy. Opportunities for continuous improvement shall be identified, assessed, and implemented as required. These opportunities shall be identified through monitoring, internal auditing, and implementation of corrective actions.

#### **Plan – Do – Check – Act**

To ensure continuous improvement of the Asset Management System, the Entity shall incorporate within the Asset Management System, a Plan-Do-Check-Act cycle (as shown in Figure 2, below).



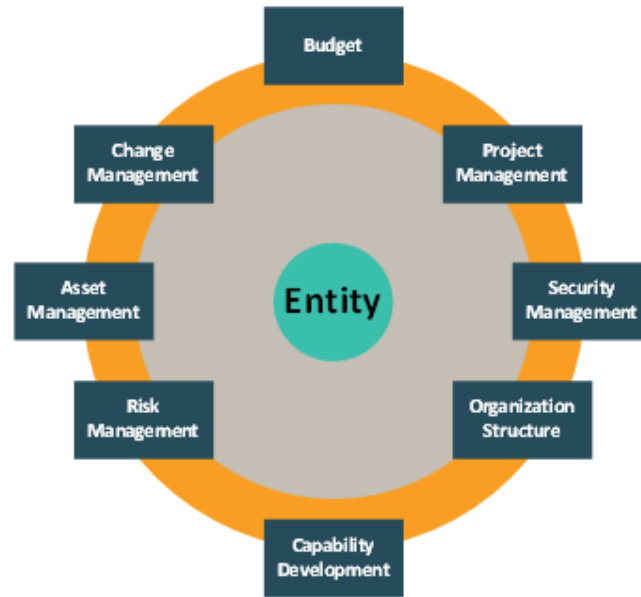
**Figure 2: Plan Do Check and Act Cycle**

#### **Top-Down & Bottom-Up Continuous Improvement**

Continuous improvement requires both robust operational practices (bottom-up), and associated management framework support (top-down). Figure 3 below, outlines the components of the Continuous Improvement Management Framework, all of which are required to successfully implement continuous improvement.



## Continuous Improvement



**Figure 3: Continuous Improvement Management Framework**

In addition to developing robust operational practices (i.e. policies, plans, processes, and procedures), the Entity shall develop sufficient oversight by its Management, covering the components outlined within Figure 3 (above). Management oversight should come in the form of a practical Business Management System, transparent reporting, or employee and stakeholder feedback.