

Maintenance Competency Framework

for immovable assets

NATIONAL
IMMOVABLE ASSET
MAINTENANCE
MANAGEMENT



public works

Department:
Public Works
REPUBLIC OF SOUTH AFRICA



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PART A: DEFINITIONS AND SCOPE



GLOSSARY

Competency	A mix of skills, related knowledge and attributes to produce a job/task to a set standard.
Competency standard	Generally accepted standard or specification of performance which sets out the skills, knowledge and attitudes required to operate effectively.
Component	A component ^(Note 1) is a specific part of a complex item ^(Note 2) that has independent physical or functional identity and specific attributes such as different life expectancy, maintenance and renewal requirements and regimes, risk or criticality. <i>Note 1: A component is separately recognised and measured (valued) in the organisation's asset register as a unique asset record, in accordance with the requirements of GRAP 17 to componentise assets.</i> <i>Note 2: A complex item is one that can be disaggregated into significant components. Infrastructure and buildings are considered complex items.</i>
Facility	A complex comprising many assets (e.g. a hospital, water treatment plant or recreation complex) which represents a single management unit for financial, operational, maintenance or other purposes.
Failure	A component has suffered a failure when it is no longer capable of fulfilling one or more of its intended functions. A component does not need to be completely unable to function to have suffered a failure. <i>For example: a pump that is still operating, but is not capable of pumping the required flow rate, has failed.</i>
Level of service	Levels of service statements describe the outputs an entity intends to deliver to customers.
Life (of an asset)	A measure of the anticipated life of an asset or component, such as time, number of cycles, distance intervals, etc.
Lifecycle	The time interval that commences with the identification of the need for an asset and terminates with the decommissioning of the asset or any liabilities thereafter.
Maintenance	All actions intended to ensure that an asset performs a required function to a specific performance standard(s) over its expected useful life by keeping it in as near as practicable to its original condition, including regular recurring activities to keep the asset operating, but specifically excluding renewal. <i>Note: Maintenance also specifically excludes restoring the condition or performance of an asset following a recognised impairment event, which would be classified as either renewal or upgrading, depending on the circumstances.</i>
Maintenance Management Plan	Describes the maintenance approach and actions for an asset, facility or portfolio of assets, with intended delivery methods and schedules, budget requirements and responsible parties.
Public building	A public building either belongs to or is used by any of the three spheres of government. Public buildings are used by organs of state to deliver services. Buildings are defined as any structure with a roof and commonly enclosed by walls, designed for storage, human occupancy, or shelter for animals, distinguished from other structures not designed for occupancy (such as fences or bridges). Fixed equipment, that is permanently attached to and a part of the operation of the building.

ACRONYMS

Acronyms relevant to this guideline include:

APP	Annual Performance Plan
CIDB	Construction Industry Development Board
CPD	Continuous Professional Development
DPSA	Department of Public Service Administration
GFMAM	Global Forum for Maintenance and Asset Management
GRAP	Generally Recognised Accounting Practice
HR	Human Resources
MMP	Maintenance Management Plan
NIMS	National Infrastructure Maintenance Strategy
NQF	National Qualifications Framework
RPL	Recognition of Prior Learning
SHE	Safety, Health and Environment
PFMA	Public Finance Management Act
SANS	South African National Standard

1. INTRODUCTION

1.1 PURPOSE

This document articulates a competency framework for the implementation of the National Immovable Asset Maintenance Management Standard (hereafter referred to the “the Standard”) for immovable assets under the custodianship of the public sector. This document should be read together with the following supporting documents:

- National Immovable Asset Maintenance Management Accounting Framework;
- National Immovable Asset Maintenance Management Monitoring and Evaluation Protocol; and
- Immovable Asset Maintenance Management Maintenance Planning Guidelines.

The purpose of this framework is to set out the competencies required to implement the National Immovable Asset Maintenance Management Standard and to provide guidance on how to formulate a strategy to ensure that these competencies are put in place within an organisation.

1.2 NATIONAL IMMOVABLE ASSET MAINTENANCE MANAGEMENT STANDARD

The National Immovable Asset Maintenance Management Standard, specifies asset care requirements for immovable assets through the lifecycle and establishes standards for organisational arrangements, competences and requirements for professionals involved with asset lifecycle activities.

Section 13 “*Competent staff*” states that the function of an asset care professional is to derive value from state assets and mitigate and minimise cost and risk associated with immovable assets. It also states that each entity shall:

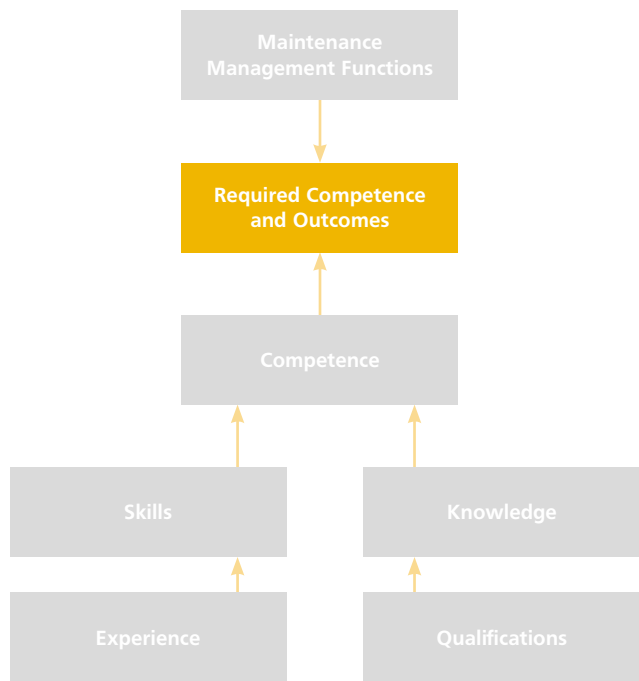
- “*Appoint persons in asset care positions that are competent, as measured against the National Immovable Asset Maintenance Management Competency Framework.*”
- “*Retrain and/or educate, and take reasonable actions to enable staff appointed, prior to commencement of the National Immovable Asset Management Maintenance Competency Framework, to be competent asset care professionals.*”
- “*When requesting tenders and quotations involving asset care services or activities, require proof of competence against the National Immovable Asset Management Maintenance Competency Framework.*”

1.3 THE SCOPE OF THE NATIONAL IMMOVABLE ASSET MAINTENANCE MANAGEMENT COMPETENCY FRAMEWORK

In order to effectively and efficiently manage maintenance, the maintenance management function requires specific competences that are developed through suitable knowledge and experience. Accordingly, this Framework consists of the following components (see Figure 1 on the following page):

- A description of the maintenance management functions required to perform maintenance management in a public sector environment.
- The competencies required to perform the functions of maintenance management, including the technical and business requirements.
- The maintenance management competency dictionary for identified core and functional competencies.
- The required behaviours (knowledge and experience) in each competency to be recognised as competent.

FIGURE 1: THE MAINTENANCE MANAGEMENT COMPETENCY FRAMEWORK



The framework provides the critical link between the maintenance management functions and the competence (combination of skills and knowledge).

2. FUNCTIONAL AREAS IN MAINTENANCE MANAGEMENT

In order for an entity to manage an immovable asset portfolio the following are five key maintenance management functions should be provided. The size and complexity of the portfolio will determine the scale of the maintenance management structure, accountability and responsibilities associated with these functions.

- **Maintenance planning refers to:**
Maintenance planning refers to the activities to develop Maintenance Management Plans that specify the detailed maintenance activities, resources, responsibilities, timescales and risks for the achievement of the asset management objectives¹.
- **Maintenance operations management refers to:**
Maintenance operations management is the organisation of maintenance activities necessary for building components to perform their intended function². It involves the identification of root causes, ensuring health and safety in maintenance, coordinating maintenance schedules and materials and equipment requirement planning (MRP).³
- **Maintenance monitoring refers to:**
Maintenance monitoring refers to the implementation of processes and measures to assess the performance and health of building components using performance indicators.⁴
- **Maintenance records and knowledge management refers to:**
Records management is a process of ensuring the proper creation, maintenance, use and disposal of records throughout their lifecycle to achieve efficient, transparent and accountable governance.⁵ It includes the developing, sharing, documenting and encoding and effectively using organisational knowledge to support the maintenance function. It also supports the selection and implementation of information and diagnostic systems.⁶
- **Performance management and reporting refers to:**
Performance management and reporting are the processes that provide essential information to determine whether performance is in accordance with the entity's management policies, standards, strategic plans, procedures, objectives and performance targets⁷.

Figure 2 provides an overview of the five maintenance management functions and their core business processes. Functional competency requirements may overlap and can be achieved through a wide range of staffing and organisational arrangements.

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1. Global Forum on Asset Management and Maintenance (GFMAM). *The Asset Management Landscape*. 2nd edition. March 2014.
 2. Sapp, D. 2014. *Facilities Operation and Maintenance, Whole Building Design Guide*.
 3. Coordination of predictive and preventative maintenance SAQA USID335898.
 4. Global Forum on Asset Management and Maintenance (GFMAM). *The Asset Management Landscape*. 2nd edition. March 2014.
 5. Records Management Policy Manual, National Archives and Records Service of South Africa, April 2004.
 6. DPSA Competency Framework.
 7. Global Forum on Asset Management and Maintenance (GFMAM). *The Asset Management Landscape*. 2nd edition. March 2014.

FIGURE 2: MAINTENANCE MANAGEMENT FUNCTIONS

Maintenance Planning	Maintenance Operations Management	Maintenance Monitoring	Maintenance Records and Knowledge Management	Maintenance Performance Management and Reporting
▶ Collate documentation	▶ Plan outage/downtime	▶ Recording calls	▶ Manage records	▶ Assess performance
▶ Analyse components	▶ Manage faults and incidents	▶ Assessing condition	▶ Maintain SHE system	▶ Monitor actions
▶ Assess condition	▶ Schedule work	▶ Monitoring condition	▶ Maintenance management system	▶ Performance reviews
▶ Determine criticality	▶ Prepare job cards	▶ Testing components	▶ Operating procedures	▶ Develop targets
▶ Determine priority	▶ Conduct activity		▶ Research and Development	▶ Prepare reports
▶ Determine approach	▶ Store management		▶ Analyse historic information	▶ Corrective actions
▶ Schedule actions	▶ Recommissioning			
▶ Cost actions				
▶ Prepare actions				

3. COMPETENCIES REQUIRED TO PERFORM THE FUNCTIONS OF MAINTENANCE MANAGEMENT

3.1 WHAT IS A COMPETENCY?

A competency can be described as a mix of skills, related knowledge and attributes to produce a job/task to a set standard. A competency standard can be described as a generally accepted standard or specification of performance which sets out the skills, knowledge and attitudes required to operate effectively.

While the concept of 'competencies' is nothing new, there is an increase in its application to realise results that are relevant to an organisation's business strategies and vision. Employees learn, develop and refine many of their competencies over the course of their careers. By communicating the competencies to employees, the organisation will empower employees to take charge of their careers; direct their own personal development, and continually self-evaluate and improve.

It is important to understand that there is a difference between a competency as defined above and job competence. Possession of a certain competency does not necessarily equate to being competent at a particular job. Job competence relates to the "what" is done while competencies relate to the "how" part. This can be explained as follows:

- **Competence – relates to the outcomes which would define effective performance**, i.e. aspects of the job at which a person is competent e.g. conducting a skills audit. People demonstrate competence by applying their competencies within the work setting.
- **Competencies – relates to behaviours used to achieve the desired outcomes and/or behaviours** underpinning successful performance i.e. aspects of the person that enables him/her to be competent e.g. communication. Competencies deal with behaviours people need to display in order to do a job effectively.

3.2 WHAT IS A COMPETENCY FRAMEWORK?

A competency framework describes a set of competency standards for employees and makes the expected knowledge, skills and attributes of employees explicit for those within and outside the organisation. When implemented correctly a competency framework can:

- create a common language for human resource interventions, as all interventions are approached according to the same competency framework and requirements;
- translate the organisation's vision and goals into expected employee behaviour, as the desired behaviour is known to all employees and training interventions are designed accordingly;
- Implement more effective and legally defensible recruitment, selection and assessment methods, as the requirements are appropriately defined and can therefore be measured accordingly by utilising different selection methods. The competencies define the requirements for success in a particular role and it can become the selection criteria;
- provide a benchmark against which individuals can be evaluated for recruitment and selection, performance management and succession planning. Since the required competency standard can be defined clearly upfront, it can also assist with reducing subjectivity in performance appraisals;
- identify areas for employee development that are directly linked to desired outcomes and organisational objectives. The same competencies become the basis for making decisions about employees' development needs;
- target training costs in areas that will realise the most return on investment; and
- identify gaps between present skill sets and future requirements to assist with the management of succession. It can assist with identifying development needs for various levels in a department and identifying pools of appropriate people that could fill those positions in the future.

This competency framework must be read in conjunction with the Department of Public Service Administration (DPSA) Public Service Middle Management Competency Framework and Public Service Senior Management Handbook for feeder and generic competencies.

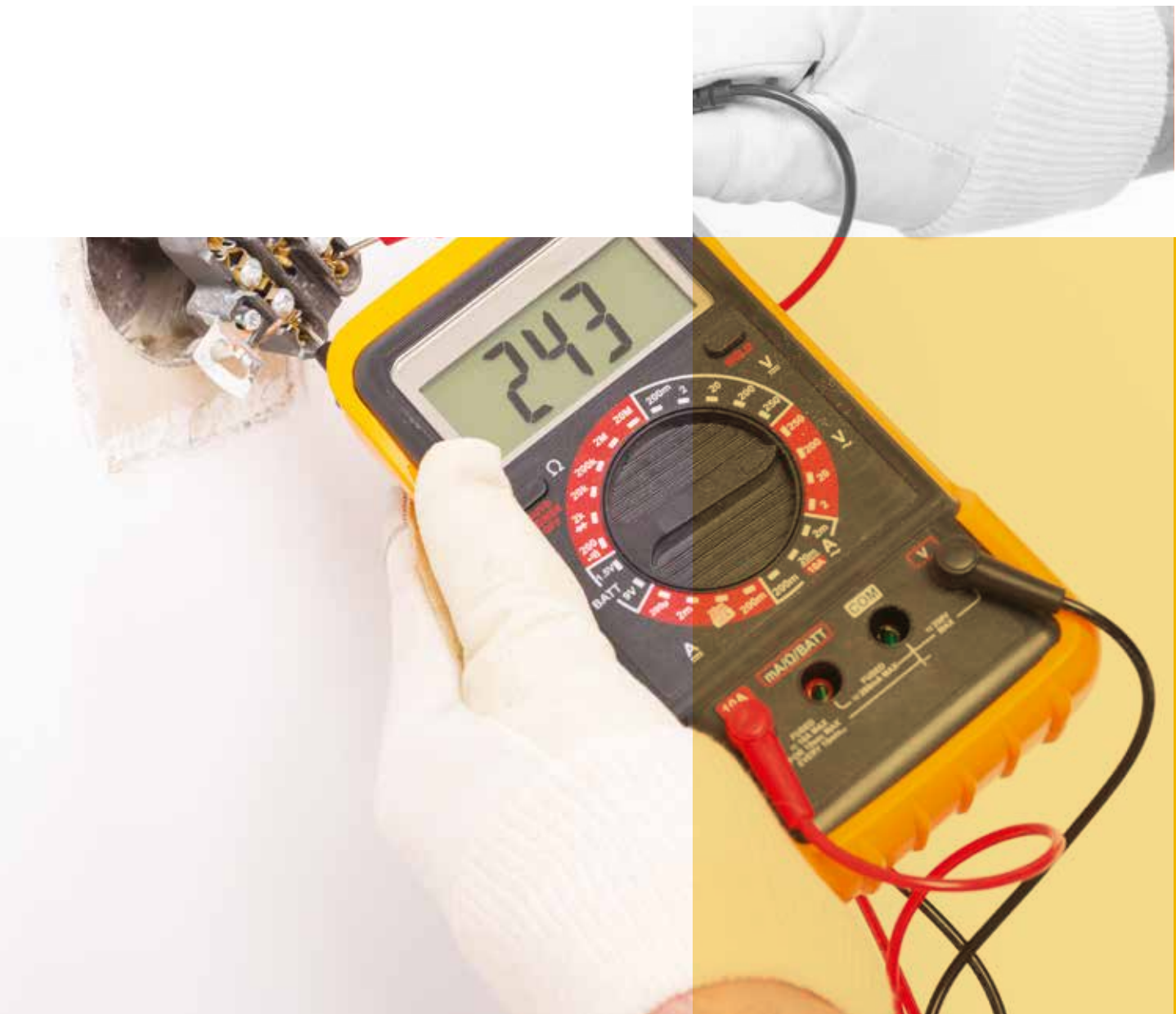
3.3 WHAT IS A COMPETENCY DICTIONARY?

A competency dictionary is an essential part of a competency framework and describes the competencies that are core or common to all jobs within an entity. It is developed through an extensive literature search and a review of best practices and should be subject to on-going refinement.

This Maintenance Management Competency Framework makes use of the Department of Public Service and Administration (DPSA) model, which establishes competencies according to the following format:

- **Competency title:** The short term used for the competency, such as, valuing diversity, conflict management, etc.
- **Competency definition:** Conveys the exact meaning of the competency as indicated by the definition.
- **Behaviour at a competent level:** What the person shows when displaying the competency. It is a behaviour that an observer can see or expect to see. The behavioural indicators integrate the knowledge, skills and attributes components of competencies so that they make the competency come “alive” in the context of how the job is performed.

PART B: THE FRAMEWORK



4. COMPETENCY FRAMEWORK FOR MAINTENANCE MANAGEMENT

The identified maintenance management functions (see section 2) provide the structure for identifying maintenance management competencies and are discussed below.

4.1 MAINTENANCE PLANNING

Maintenance Planning	Maintenance Operations Management	Maintenance Monitoring	Maintenance Records and Knowledge Management	Maintenance Performance Management and Reporting
Collate documentation	Plan outage/downtime	Recording calls	Manage records	Assess performance
Analyse components	Manage faults and incidents	Assessing condition	Maintain SHE system	Monitor actions
Assess condition	Schedule work	Monitoring condition	Maintenance management system	Performance reviews
Determine criticality	Prepare job cards	Testing components	Operating procedures	Develop targets
Determine priority	Conduct activity		Research and Development	Prepare reports
Determine approach	Store management		Analyse historic information	Corrective actions
Schedule actions	Recommissioning			
Cost actions				
Prepare actions				

4.1.1 DEFINITION AND PURPOSE

Maintenance planning refers to the activities to develop Maintenance Management Plans that specify the detailed maintenance activities, resources, responsibilities, timescales and risks for the achievement of the asset management objectives⁸.

The function is responsible for short, medium and long term planning of maintenance, which includes collating and analysing maintenance information, selecting a maintenance approach, costing and scheduling of maintenance tasks and budgeting for the management and implementation of the required maintenance.

Note: The maintenance planning function is described in more detail in the “*Immovable Asset Maintenance Planning Guideline for Public Buildings*”.

8. Global Forum on Asset Management and Maintenance (GFMAM). *The Asset Management Landscape*. 2nd edition. March 2014.

To conduct maintenance planning, the following outcomes should be achieved:

- align maintenance plans with organisational plans;
- collate documentation and determine facility components;
- analyse components to determine the impact and the likelihood of failure;
- assess the condition and determine the reliability of components;
- determine the criticality of a component;
- determine the priority of a component;
- determine a maintenance approach;
- schedule maintenance actions;
- cost maintenance actions; and
- prepare a maintenance budget.

4.1.2 COMPETENCIES REQUIRED

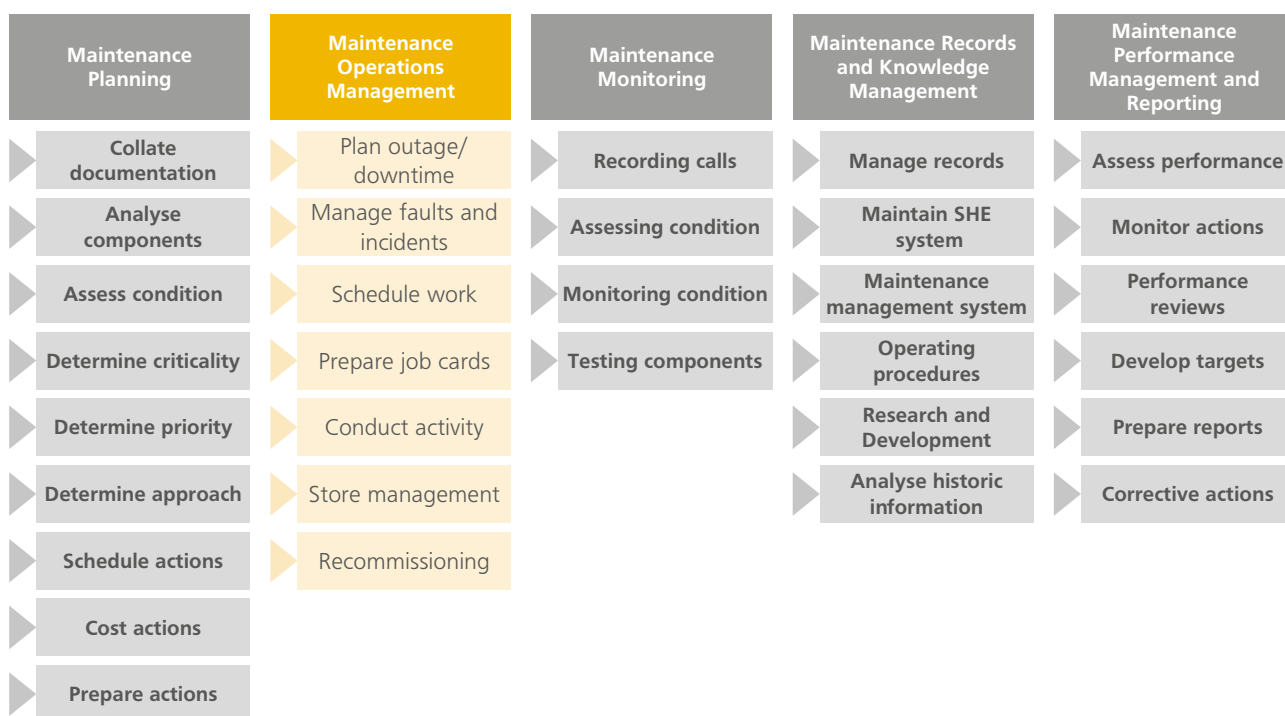
The competencies required to achieve the specified outcomes are set out in the table below.

TABLE 1: MAINTENANCE PLANNING: COMPETENCIES REQUIRED

Maintenance Planning	
Outcomes	Summary of Competencies
Align maintenance plans with organisational plans	Integration of organisational plans: Planning maintenance and setting maintenance objectives and goals while ensuring that maintenance, lifecycle, human resources, procurement and logistic plans align with organisational and asset management plans.
Collate documentation and determine facility components	Identify components: The process of identifying an asset into its major elements of construction. Building components with useful life are: building structure, construction exterior and walls exterior, construction interior, building acquisition, roof covering, floor covering, heating and ventilating and cooling system, electrical and lighting system, fire protection, plumbing system, elevator system, fixed equipment assets and IT infrastructure. Interpretation of codes of practice: Understanding and knowledge regarding the technical standards and legislation that include processes for the identification, acceptable updating and compliance assurance of standards and legislation in the asset management context. The development of specifications and measurement of delivery against specifications
Analyse components to determine the impact and the likelihood of failure	Lifecycle analysis: Analysing, interpreting and balancing the costs and benefits of different maintenance activities of various assets.
Assess the condition and determine the reliability of components	Condition/reliability assessment: Execution of processes and activities used by an organisation to assess the performance and health of its assets. Reliability engineering: Ensuring that an item shall operate to a defined standard for a defined period of time in a defined environment based on reliability analysis techniques

Maintenance Planning	
Outcomes	Summary of Competencies
Determine the criticality of a component	Identify components: The process of identifying an asset into its major elements of construction. Building components with useful life are: building structure, construction exterior and walls exterior, construction interior, building acquisition, roof covering, floor covering, heating and ventilating and cooling system, electrical and lighting system, fire protection, plumbing system, elevator system, fixed equipment assets and IT infrastructure. Interpretation of codes of practice: Understanding and knowledge regarding the technical standards and legislation that include processes for the identification, acceptable updating and compliance assurance of standards and legislation in the asset management context. The development of specifications and measurement of delivery against specifications.
Determine the priority of a component	Identify components: The process of identifying an asset into its major elements of construction. Building components with useful life are: building structure, construction exterior and walls exterior, construction interior, building acquisition, roof covering, floor covering, heating and ventilating and cooling system, electrical and lighting system, fire protection, plumbing system, elevator system, fixed equipment assets and IT infrastructure. Interpretation of codes of practice: Understanding and knowledge regarding the technical standards and legislation that include processes for the identification, acceptable updating and compliance assurance of standards and legislation in the asset management context. The development of specifications and measurement of delivery against specifications.
Determine a maintenance approach	Lifecycle analysis: Analysing, interpreting and balancing the costs and benefits of different maintenance activities of various assets Reliability engineering: Ensuring that an item shall operate to a defined standard for a defined period of time in a defined environment based on reliability analysis techniques.
Schedule maintenance actions	Project Management: Planning and managing projects by creating work breakdown schedules (WBS), activity schedules, time scales and timelines with associated budgets in order to deliver projects on time, within cost and at the required quality level.
Cost maintenance actions	Cost estimating: Interpreting information and estimating the cost for short, medium and longer terms on all assets and services related to the maintenance of assets.
Prepare a maintenance budget	Budgeting and Financial Management: Planning of the work unit's budget and managing income and expenditure through responsible implementation of policies, practices and decisions in order to achieve unit objectives effectively and efficiently. Basic Accounting: Knowledge of the theory and practice of recording, classifying, examining and analysing data and records of financial transactions. The theories, principles, practices and terminology of accountancy are used in day-to-day maintenance activities.

4.2 MAINTENANCE OPERATIONS MANAGEMENT



4.2.1 DEFINITION AND PURPOSE

Maintenance operations management is the organisation of maintenance activities necessary for building components to perform their intended function⁹. It involves the identification of root causes, ensuring health and safety in maintenance, coordinating maintenance schedules and materials and equipment requirement planning (MRP).¹⁰

The maintenance operations management function may be in-house with own resources or outsourced where the work is executed by contractors.

The maintenance operation management function seeks to achieve the following outcomes:

- Short term scheduling of work and resource planning.
- Planning of shutdown or outage.
- Preparing maintenance job cards.
- For **outsourced**, maintenance operations management entails:
 - developing specifications for work;
 - procuring service providers;
 - managing contracts;
 - managing access to site;
 - verifying and signing off of work; and
 - completing job cards and paying service providers.

9. Sapp, D. 2014. *Facilities Operation and Maintenance, Whole Building Design Guide*.

10. Coordination of predictive and preventative maintenance SAQA USID335898.

- For **in-house**, maintenance operations management entails:
 - briefing teams and issuing work orders;
 - management of tools and maintenance equipment;
 - materials management;
 - executing of maintenance function; and
 - completing job cards.
- Store management, which includes:
 - purchasing spares and tools;
 - managing and controlling stock levels; and
 - issuing of spares and tools.
- Re-commissioning components and facilities after shutdown and outage.
- Managing safety, health and the environment.
- Managing faults and incidents.

4.2.2 OUTCOMES AND COMPETENCIES

The competencies required to achieve the specified outcomes are set out in the table below.

TABLE 2: OPERATIONS MANAGEMENT: COMPETENCIES REQUIRED

Maintenance Operations Management	
Outcome	Competencies required
Scheduling work and resource planning	Cost estimating: Interpreting information and estimating the cost for short, medium and longer terms on all assets and services related to the maintenance of assets. Planning and organising: Planning and organising the work of the work unit and groups, using goal setting, objectives, targets, creating work schedules and work plans with associated budgets and resources, according to the organisation's procedures, in order to achieve the tasks, functions and results/outputs required of the work unit.
Planning shutdown or outage (including demand management and decanting) and Prepare job cards	Identify components: The process of identifying an asset into its major elements of construction. Building components with useful life are: building structure, construction exterior and walls exterior, construction interior, building acquisition, roof covering, floor covering, heating and ventilating and cooling system, electrical and lighting system, fire protection, plumbing system, elevator system, fixed equipment assets and IT infrastructure. Interpretation of codes of practice: Understanding and knowledge regarding the technical standards and legislation that include processes for the identification, acceptable updating and compliance assurance of standards and legislation in the asset management context. The development of specifications and measurement of delivery against specifications. Planning and organising: Planning and organising the work of the work unit and groups, using goal setting, objectives, targets, creating work schedules and work plans with associated budgets and resources, according to the organisation's procedures, in order to achieve the tasks, functions and results/outputs required of the work unit.

Maintenance Operations Management	
Outcome	Competencies required
Manage outsourcing of work: • developing specifications for work; • procuring service providers; • managing contracts; • managing access to site; • verifying and signing off of work; and • completing job cards and paying service providers.	Procurement and Supply Chain Management: Ensuring that all outsourced maintenance management activities are aligned with the maintenance management plan of the organisation and monitor the outcomes of these activities against these objectives. Ensure that raw materials, equipment, parts and substitute components are available when and where required Ensure that raw materials, equipment, parts and substitute components are available when and where required Project Management: Planning and managing projects by creating work breakdown schedules (WBS), activity schedules, time scales and timelines with associated budgets in order to deliver projects on time, within cost and at the required quality level. Testing components and applying technology on maintenance diagnostic systems: Using technology in maintenance management systems to support the decision-making processes in accordance with the maintenance management plan. Basic Accounting: Knowledge of the theory and practice of recording, classifying, examining and analysing data and records of financial transactions. The theories, principles, practices and terminology of accountancy are used in day-to-day maintenance activities.
Manage in-house work: • briefing teams and issuing work orders; • management of tools and maintenance equipment; • materials management; • monitoring maintenance work; and • completing job cards.	Planning and organising: Planning and organising the work of the work unit and groups, using goal setting, objectives, targets, creating work schedules and work plans with associated budgets and resources, according to the organisation's procedures, in order to achieve the tasks, functions and results/outputs required of the work unit. Testing components and applying technology on maintenance diagnostic systems: Using technology in maintenance management systems to support the decision-making processes in accordance with the maintenance management plan.
Manage stores: • purchasing spares and tools; • managing and controlling stock levels; and • issuing of spares and tools.	Planning and organising: Planning and organising the work of the work unit and groups, using goal setting, objectives, targets, creating work schedules and work plans with associated budgets and resources, according to the organisation's procedures, in order to achieve the tasks, functions and results/outputs required of the work unit. Basic accounting: Knowledge of the theory and practice of recording, classifying, examining and analysing data and records of financial transactions. The theories, principles, practices and terminology of accountancy are used in day-to-day maintenance activities. Procurement and Supply Chain Management: Ensuring that all outsourced maintenance management activities are aligned with the maintenance management plan of the organisation and monitor the outcomes of these activities against these objectives. Ensure that raw materials, equipment, parts and substitute components are available when and where required
Manage Safety, Health and Environment	Interpretation of codes of practice: Understanding and knowledge regarding the technical standards and legislation that include processes for the identification, acceptable updating and compliance assurance of standards and legislation in the asset management context. The development of specifications and measurement of delivery against specifications.

Maintenance Operations Management	
Outcome	Competencies required
Re-commission components after shutdown or outage	Planning and organising: Planning and organising the work of the work unit and groups, using goal setting, objectives, targets, creating work schedules and work plans with associated budgets and resources, according to the organisation's procedures, in order to achieve the tasks, functions and results/outputs required of the work unit. Asset operations: Asset operations is concerned with processes that provide instructions to operators about how to operate the asset with the appropriate design, maintenance, and operational parameters. This includes the development of an asset operations strategy and plans that outline the approach, activities and resources involved in managing and implementing operations.
Manage faults and incidents	Fault and Incidents Management: The management of faults and incidents in a systematic manner. This includes determining the likelihood of failure, fault analysis, use of standard responses, temporary and permanent repairs as well as the taking over and handing back of sites.

4.3 MAINTENANCE MONITORING

Maintenance Planning	Maintenance Operations Management	Maintenance Monitoring	Maintenance Records and Knowledge Management	Maintenance Performance Management and Reporting
▶ Collate documentation	▶ Plan outage/downtime	▶ Recording calls	▶ Manage records	▶ Assess performance
▶ Analyse components	▶ Manage faults and incidents	▶ Assessing condition	▶ Maintain SHE system	▶ Monitor actions
▶ Assess condition	▶ Schedule work	▶ Monitoring condition	▶ Maintenance management system	▶ Performance reviews
▶ Determine criticality	▶ Prepare job cards	▶ Testing components	▶ Operating procedures	▶ Develop targets
▶ Determine priority	▶ Conduct activity		▶ Research and Development	▶ Prepare reports
▶ Determine approach	▶ Store management		▶ Analyse historic information	▶ Corrective actions
▶ Schedule actions	▶ Recommissioning			
▶ Cost actions				
▶ Prepare actions				

4.3.1 DEFINITION AND PURPOSE

Maintenance monitoring refers to the implementation of processes and measures to assess the performance and health of building components using performance indicators.¹¹

The maintenance monitoring function entails monitoring of the performance of components and equipment. The function seeks to achieve the following outcomes:

- Recording maintenance calls and determining maintenance actions based on the criticality and priority of the component that is causing the failure.
- Assessing the condition of a facility or component by inspecting, assessing, measuring and interpreting the resultant data, to indicate the condition of a specific component so as to determine the need for some preventative or remedial action.
- Monitoring condition by installing measuring devices and measuring the performance of critical components on an on-going basis.
- Testing components on a regular basis to determine the extent to which the component meets the performance requirements.

4.3.2 OUTCOMES AND COMPETENCIES

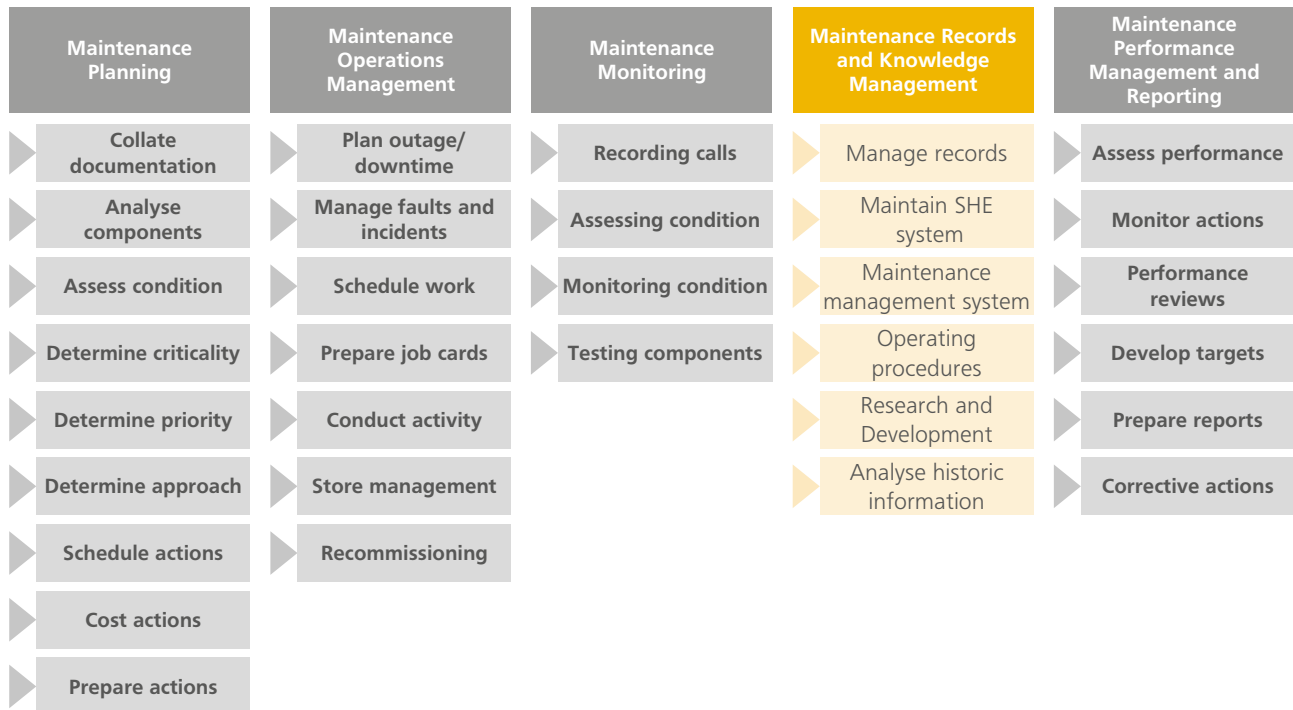
The competencies required to achieve the specified outcomes are set out in the table below.

TABLE 3: MAINTENANCE MONITORING FUNCTION: COMPETENCIES REQUIRED

Maintenance monitoring function	
Outcome	Competencies required
Record maintenance calls and determine maintenance actions	Administration: Execution of administrative activities and procedures for the operation of an office or facility through organising and scheduling events, record keeping and effective communication with stakeholders. Risk assessment and monitoring: Identifying, quantifying and mitigating risk and exploiting opportunities.
Assessing the condition of a facility or component	Condition assessment: Execution of processes and activities used by an organisation to assess the performance and health of its assets Interpretation of codes of practice: Understanding and knowledge regarding the technical standards and legislation that include processes for the identification, acceptable updating and compliance assurance of standards and legislation in the asset management context. The development of specifications and measurement of delivery against specifications.
Monitoring condition and Testing Components	Testing components and applying technology on maintenance diagnostic systems: Using technology in maintenance management systems to support the decision-making processes in accordance with the maintenance management plan.
Analysing historic maintenance information	Reliability engineering: Ensuring that an item shall operate to a defined standard for a defined period of time in a defined environment based on reliability analysis techniques.

11. Global Forum on Asset Management and Maintenance (GFMAM). *The Asset Management Landscape*. 2nd edition. March 2014.

4.4 RECORDS AND KNOWLEDGE MANAGEMENT



4.4.1 DEFINITION AND PURPOSE

Records management is a process of ensuring the proper creation, maintenance, use and disposal of records throughout their lifecycle to achieve efficient, transparent and accountable governance.¹² It includes the developing, sharing, documenting and encoding and effectively using organisational knowledge to support the maintenance function. It also supports the selection and implementation of information and diagnostic systems.¹³

The function entails the management of knowledge and records on maintenance and managing a maintenance management system and seeks to achieve the following outcomes:

- Maintenance records management including the management of all maintenance records and resource material such as manuals, documents, guarantees, warranties, job cards, call centre records.
- Knowledge management through developing operating procedures and maintaining safety, health and environment systems. This should be undertaken in a manner that is responsive to on-going developments such as sustainability, green buildings and energy efficiency.
- Implementing and maintaining the maintenance management system in a manner that provides information so as to analyse historic information and records to determine the reliability and failure intervals for a component.

12. Records Management Policy Manual, National Archives and Records Service of South Africa, April 2004.

13. DPSA Competency Framework.

4.4.2 OUTCOMES AND COMPETENCIES

The competencies required to achieve the specified outcomes are set out in the table below.

TABLE 4: RECORDS AND KNOWLEDGE MANAGEMENT FUNCTION: COMPETENCIES REQUIRED

Records and knowledge management function	
Outcome	Competencies required
Maintenance records management	Administration: Execution of administrative activities and procedures for the operation of an office or facility through organising and scheduling events, record keeping and effective communication with stakeholders.
Knowledge management	Business Analysis (Procedure development): Measuring and improving or upgrading of work methods, procedures and systems and decreasing costs in order to improve the quality and cost efficiency of services and products delivered to clients.
Maintenance Management System	Applying technology on maintenance management systems: Evaluating, identifying and using appropriate technologies in the workplace in order to enhance productivity, efficiency, responsiveness and the quality of service provided in order to aid the achievement of the organisation's goals and objectives. Monitoring and overseeing the performance of systems and staff.

4.5 PERFORMANCE MANAGEMENT AND REPORTING

4.5.1 DEFINITION AND PURPOSE

Maintenance Planning	Maintenance Operations Management	Maintenance Monitoring	Maintenance Records and Knowledge Management	Maintenance Performance Management and Reporting
▶ Collate documentation	▶ Plan outage/downtime	▶ Recording calls	▶ Manage records	▶ Assess performance
▶ Analyse components	▶ Manage faults and incidents	▶ Assessing condition	▶ Maintain SHE system	▶ Monitor actions
▶ Assess condition	▶ Schedule work	▶ Monitoring condition	▶ Maintenance management system	▶ Performance reviews
▶ Determine criticality	▶ Prepare job cards	▶ Testing components	▶ Operating procedures	▶ Develop targets
▶ Determine priority	▶ Conduct activity		▶ Research and Development	▶ Prepare reports
▶ Determine approach	▶ Store management		▶ Analyse historic information	▶ Corrective actions
▶ Schedule actions	▶ Recommissioning			
▶ Cost actions				
▶ Prepare actions				

Performance management and reporting are the processes that provide essential information to determine whether performance is in accordance with the entity's management policies, standards, strategic plans, procedures, objectives and performance targets¹⁴. This function entails managing the performance of the maintenance management function to the desired level and ensuring that targets are met. The performance management and reporting function seeks to achieve the following outcomes:

- Assessing the current state of maintenance management performance.
- Developing performance improvement targets.
- Monitoring maintenance actions implemented against the maintenance plan.
- Preparing monthly reports against the maintenance plan.
- Compiling quarterly performance reviews.
- Analysing and planning corrective actions.

4.5.2 OUTCOMES AND COMPETENCIES

The competencies required to achieve the specified outcomes are set out in the table below.

TABLE 5: PERFORMANCE MANAGEMENT AND REPORTING FUNCTION: COMPETENCIES REQUIRED

Performance management and reporting function	
Outcome	Competencies required
Assessing the current state of maintenance management performance	Performance Improvement: Evaluating, identifying and using appropriate technologies in the workplace in order to enhance productivity, efficiency, responsiveness and the quality of service provided in order to aid the achievement of the organisation's goals and objectives. Monitoring and overseeing the performance of systems and staff. Mentoring and professional development: Developing and coaching others and constructively reviewing the work of others in order to improve and advance the skills, knowledge and performance levels of those who report to them.
Developing performance improvement targets	Performance Improvement: Evaluating, identifying and using appropriate technologies in the workplace in order to enhance productivity, efficiency, responsiveness and the quality of service provided in order to aid the achievement of the organisation's goals and objectives. Monitoring and overseeing the performance of systems and staff.
Monitoring maintenance actions implemented against the maintenance plan: • Monthly reporting against the maintenance plan; • Quarterly performance reviews; and • Analysing and planning corrective actions.	Performance Improvement: Evaluating, identifying and using appropriate technologies in the workplace in order to enhance productivity, efficiency, responsiveness and the quality of service provided in order to aid the achievement of the organisation's goals and objectives. Monitoring and overseeing the performance of systems and staff. Project Management: Planning and managing projects by creating work breakdown schedules (WBS), activity schedules, time scales and timelines with associated budgets in order to deliver projects on time, within cost and at the required quality level.

14. Global Forum on Asset Management and Maintenance (GFMAM). *The Asset Management Landscape*. 2nd edition. March 2014.

4.6 APPLICATION OF MAINTENANCE FUNCTIONS AND COMPETENCIES

For each maintenance management function, a combination of technical and business competencies are required. The table below shows a generic application of these maintenance management functions against competencies.

TABLE 6: BUSINESS AND TECHNICAL COMPETENCIES PER MAINTENANCE MANAGEMENT FUNCTION

GROUP	COMPETENCY	Maintenance planning	Maintenance operations management	Maintenance monitoring	Knowledge and records management	Performance management and reporting
Technical	Identify components					
	Asset operations					
	Condition assessment					
	Interpretation of codes of practice					
	Cost estimating					
	Fault and incident management					
	Testing components and applying technology on maintenance diagnostic systems					
	Applying technology on maintenance management systems					
	Lifecycle analysis					
	Reliability engineering					
Business	Administration					
	Basic accounting					
	Budgeting and financial management					
	Business Analysis (Procedure development)					
	Mentoring and professional development					
	Performance Improvement					
	Planning and organising					
	Procurement and supply chain management					
	Project management					
	Risk Assessment and monitoring					
	Integration of organisational plans					

PART C: APPLYING THE FRAMEWORK



5. IMPLEMENTING THE COMPETENCY FRAMEWORK

5.1 APPLYING THE FRAMEWORK

The Competency Framework (see above) sets out the maintenance planning functions and identifies the competencies required for core (generic and feeder), business and technical. An entity undertaking public sector maintenance functions should assess the competencies of its human resources against the framework so as to determine gaps and allocate responsibility. A process to do this is outlined below:

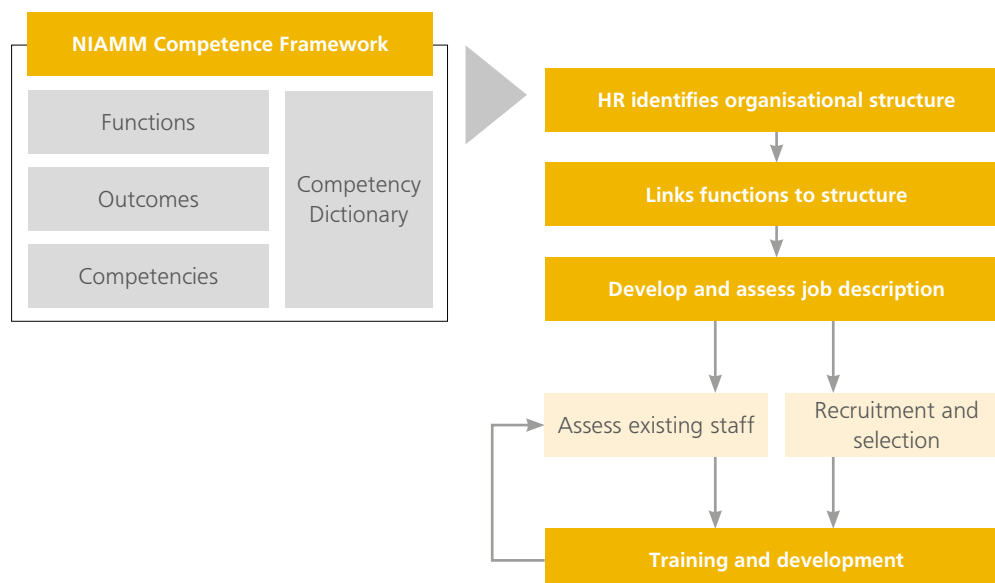
- Scope the maintenance management function within the entity and determine the scale and complexity of the portfolio under management.
- Determine the required competency per maintenance management function for the entity as specified in the Competency Framework.
- Assess the current competence in the maintenance management function.
- Review the scope, the required competency and the current competency to determine what is required to match the current and desired (i.e. the gaps).
- Develop a competency strategy to remedy the current situation. These strategies should be in alignment with the human resource practices within the entity and could include for example recruitment of new staff, training, restructuring of existing jobs etc.
- Implementation of the strategies;
 - development of a human resources plan with the human resources practitioners to address needs; and
 - feedback, monitoring and evaluation of the human resources plan against requirements for maintenance management functions.

5.2 DEVELOPING COMPETENCY

Once the gaps have been identified, the maintenance planning function should compile a strategy to address the gap through training, recruitment, and other human resource development processes. Once it has been customised to meet the requirements of an organisation, the Maintenance Management Competency Framework can underpin a systematic approach to gaining assurance that people working in maintenance management are competent to fulfill their roles and responsibilities.

The Figure below shows how the Maintenance Management Competency Framework can be used to ensure that people working in maintenance management are developed in accordance with an organisation's maintenance management plan and objectives. The key aspect is the link between the framework where the functions are defined and the organisations structure and where the maintenance management functions are undertaken.

FIGURE 3: IMPLEMENTING THE FRAMEWORK



Each organisation needs to use the Competence Framework to set the Competence Standard required for the maintenance competence. This is based on the complexity and scale of the portfolio as well as the maintenance functions, and may be unique to the organisation.

The things to consider when moving from the Competence Framework to developing the Competence Standard:

- link maintenance management function to Specific outcomes identified in the Competency Framework;
- where not available, develop the occupancy profile in align with the Organising Framework for Occupations (OFO)
- develop the occupational profiles linked to the Organising Framework for Occupations (OFO);
- define the learning (knowledge and skills) required to be competent to practice an occupation or an occupational specialisation
- identify the assessment specifications for the knowledge requirements identified in the Competency Framework;
- identify the NQF levels for each occupational profile;
- determine the occupational standards and qualifications/ accredited outcome;
- are there existing accredited/registered qualifications or programmes that meet these requirements;
- identify the gaps between the existing accredited/registered qualifications or programmes and that required to meet the requirements;
- the registered/accredited qualifications/programmes must be relevant and accessible;
- list the registered/accredited qualification/programmes;
- if there are no current qualification or programmes that address the required learning a qualification then needs to be developed;
- the competency is then defined by the minimum accredited outcomes at a specific NQF level with a prescribed duration of relevant experience required to perform at the identified occupational level; and
- recognition of prior learning means the comparison of the previous learning and experience of a learner howsoever obtained against the learning outcomes required for a specified qualification.

5.3 EDUCATIONAL PATHWAYS TOWARDS GETTING CERTIFIED COMPETENT

The required qualifications for key competencies are provided in the tables below. Qualifications must be obtained at the relevant National Qualification Framework (NQF) level if so indicated. Other qualifications may be obtained through short courses or the system of Continuous Professional Development (CPD).

TABLE 7: EXAMPLE QUALIFICATIONS FOR TECHNICAL COMPETENCIES

Competencies	Entry qualification	Short courses	Experience
Lifecycle Analysis	Qualification in Facilities Management, Building Science, Architecture, Quantity Surveying, Cost Engineering or relevant engineering (based on type of asset) from an university at relevant NQF Level	Short course in Lifecycle Analysis	NQF level > 6 – 3 years
Reliability engineering		Short course in Reliability Engineering	
Identify components			
Condition assessment			
Interpretation of codes of practice			
Cost estimating			
Fault and incident management		Short course in Maintenance Management or Incidence Management	NQF Level > 5 – 4 years
Applying technology on maintenance management systems	Qualification in Information Technology at the relevant NQF level		NQF Level > 4 – 8 years
Testing components and applying technology on maintenance diagnostic systems	Qualification in electronic engineering and technology at the relevant NQF level		

TABLE 8: EXAMPLE QUALIFICATIONS FOR BUSINESS COMPETENCIES

Competencies	Entry qualification	Short courses	Experience
Administration	Qualification in Business Management at relevant NQF level or Qualification in Public Service Administration at relevant NQF level and National Diploma Public Finance Management and Administration SAQA Unit Standard ID: 49554 or similar	Short courses in any of the competencies.	NQF level > 6 – 3 years NQF Level > 5 – 4 years NQF Level > 4 – 8 years
Basic accounting			
Budgeting and financial management			
Business Analysis (Procedure development)			
Mentoring and professional development			
Performance Improvement			
Planning and organising			
Procurement and supply chain management			
Project management			
Risk Assessment and monitoring			
Integration of organisational plans			

5.4 WRITING JOB DESCRIPTIONS

Job descriptions are important for ensuring the link between the Competency Framework and the functions performed by staff. Job descriptions can be improved or updated by linking them to either the generic or a customised version of the framework.

In the case of an existing job description, one approach is to indicate which units or elements of competence are applicable by adding a list of the relevant titles.

In the case of a new job description, the units of competence can serve as a useful prompt in deciding the nature and scope of responsibilities.

The sphere of influence and complexity of an organisation will impact the requirements for maintenance management. The entity's job grading system (e.g. Hay or Equate) and the assessment of job descriptions evaluate both sphere of influence and complexity and associate that with the identification of qualification and experience required.

Linking unit titles to job descriptions can:

- help ensure job descriptions for maintenance management staff are complementary and line up with maintenance management plan and objectives;
- facilitate the process of developing new job descriptions and revising existing job descriptions; and
- enable the management and development needs of the job holder to be defined and planned with some precision.

5.5 PLANNING RECRUITMENT AND SELECTION

The starting point for effective recruitment and selection is ensuring that the requirements of the job to be filled are explicit and up to date. As described above, the framework provides a useful tool to support the development and review of job descriptions. In particular, when job descriptions are linked to the relevant units, these units will contain a description of the skills, behaviours, knowledge and understanding required for competent performance.

This provides a useful indication of the attributes of the ideal candidate for the job (that is, the basis of a person specification). In this way, the framework can be used to support the development of accurate and up-to-date job descriptions and person specifications, which are the foundation of effective recruitment and selection.

5.6 IDENTIFYING LEARNING AND DEVELOPMENT NEEDS

When job descriptions have been linked to the framework, job holders or their employers can review the units relevant to their job, to assess where they are currently competent and where they may require further learning and development.

This process of identifying learning and development needs may take place in a variety of contexts, from informal (e.g. self-assessment) through to more formal processes (e.g. supervision and appraisal).

A job holder and his/her line manager may agree to review the required skills, knowledge and understanding from selected units. This provides an objective standard against which to judge the job holder's existing skills, knowledge and understanding and to identify and prioritise training and development needs.

In this way, the framework can be used to identify and prioritise learning and development needs and recognise existing competences, knowledge and understanding.

5.7 DEVELOPING ROLE PROFILES

Role profiles differ from job descriptions in that they describe what the organisation should expect from everyone with a particular level of responsibility or experience: for example, Asset Head or Maintenance Management Planner. Job descriptions focus on what is expected of individuals with different levels of responsibility within a role.

Role profiles are a useful tool for ensuring that the structure or roles and responsibilities within an organisation are consistent with what the organisation is trying to achieve.

In developing role profiles for maintenance management, the first task is to define the structure of roles and responsibilities necessary to deliver the maintenance management plan and objectives. The second task is to define the levels of competence and responsibility needed to fulfil these roles and ensure there are healthy development paths between them.

5.8 PLANNING TRAINING ACTIVITIES

Whether in their generic form or customised, the knowledge and understanding requirements can be used in designing and planning education programmes, training courses and other development activities.

In planning or designing a learning programme, it is useful to subdivide the relevant knowledge and understanding into the following categories:

- general knowledge and understanding;
- industry or sector-specific knowledge and understanding; and
- organisation and context-specific knowledge and understanding.

The framework provides a basis for discussing and agreeing personal learning objectives and the evidence that is needed to demonstrate achievement of these.

The framework also provides an objective benchmark against which to evaluate the impact of organisational learning and development activities.

5.9 CAREER PLANNING

For those seeking to develop a career in maintenance management, the framework provides a basis for planning and demonstrating achievement. This is particularly relevant to people who want to move into new work areas which require new competences, knowledge and understanding. For organisations, the framework enables career paths to be defined in ways that support the maintenance management approach.

5.10 PLANNING CONTINUING PROFESSIONAL DEVELOPMENT (CPD)

Most professional bodies require their members to demonstrate a commitment to maintaining and updating their professional competence. CPD is known to be most effective when individuals take responsibility for their own learning and development. This requires them to assess their current skills, knowledge and understanding and to set objectives for their personal development, both to keep up to date and to meet future needs.

The CPD process can be supported by self-assessment against the relevant units and planning and prioritising learning and development according to the contents of those units.

5.11 DEVELOPING AN OCCUPATIONAL QUALIFICATION

The Skills Development Act defines an occupational qualification as “a qualification associated with a trade, occupation or profession, resulting from work-based learning and consisting of knowledge unit standards, practical unit standards and work experience unit standards”. All occupational qualifications are assessed externally through a nationally standardised integrated summative assessment.

The purpose of an occupational qualification is to qualify a learner to practice an occupation or a specialisation related to an occupation - not to qualify a learner in a field of learning.

An occupational qualification define the learning required to be competent to practice an occupation or an occupational specialisation in a range of working contexts in both the formal and informal economy as well as in the public and private sectors. All occupational qualifications are linked to the Organising Framework for Occupations (OFO) and must:

- a) be ‘fit-for-purpose’;
- b) reflect workplace requirements, i.e. be demand or opportunity led and not supply driven;
- c) reflect three forms of learning, each requiring a different approach to provision and assessment, i.e.:
 - i. knowledge and theory (minimum 20% of total credits of the qualification);
 - ii. practical skills (minimum 20% of total credits of the qualification);
 - iii. work experience (minimum 20% of total credits of the qualification);
 - iv. the balance of the credits (40%) can be allocated in a proportion appropriate to the needs of the particular occupation or specialisation; and
- d) must have an external assessment component.

Occupational qualifications are distinguished from one another on the basis of the occupation and specialisation title (if applicable) to which they relate, the NQF level on which they are registered and by their total credit value.

PART D: COMPETENCY DICTIONARY



6. TECHNICAL COMPETENCY DICTIONARY

6.1 Testing Components and applying technology on maintenance diagnostic systems	
Definition	Must be able to effectively evaluate, identify and use appropriate technologies in the workplace in order to enhance productivity, efficiency, responsiveness and the quality of service provided, in order to aid the achievement of the organisation's goals and objectives. Ability to monitor and oversee the performance of systems and components.
Key words	Evaluate technology; Apply technology; Best practice.
Behaviour considered competent	- Identifies technological changes, scientific research, methodologies and automation options that would support/enhance success in the achievement of objectives of the work unit and the organisation. - Encourage staff to stay abreast and informed about technological changes, scientific research and automation. - Applies evolving technologies and methodologies to the organisation or work unit's needs. - Ensure that all staff is trained and competent to apply new technology. - Advise on the appropriate systems to use in the organisation. - Test new technologies, work processes and practices to make transactions and the collection of data and information more effective. - Evaluate recent technological innovations as they relate to workplace systems. - Integrate technology and information technology systems with workplace activities in order to resolve operational problems. - Ensure technology is adequate to help achieve business objectives. - Ensure staff has access to the appropriate technology.
6.2 Applying technology on maintenance management systems	
Definition	Must be able, through using technology on maintenance management systems, to support the decision making processes in accordance with the maintenance management plan.
Key words	Building management system, Information system, Maintenance system, Management system
Behaviour considered competent	- Ensure technology is adequate to help achieve business activities - Ensure that all staff is trained and competent to apply new technology. - Advise on the appropriate systems to use in the organisation. - Organise maintenance activities on maintenance management system - Schedule maintenance activities on maintenance management system - Manage maintenance activities through the maintenance management system
6.3 Asset Operations	
Definition	Asset operations: Asset operations is concerned with processes that provide instructions to operators about how to operate the asset with the appropriate design, maintenance, and operational parameters. This includes the development of an asset operations strategy and plans that outline the approach, activities and resources involved in managing and implementing operations.
Key Words	Equipment operation, Component operation
Behaviour considered competent	- Develop and keep up to date an asset operation strategy and plans that outline the approach, activities and resources involved in managing and implementing operations. - Interpret design and operational parameters and develop operating procedures for equipment - Understand operations manual and drawing for components and equipment - Interpret instructions from operations manual and changing this into operating procedures - Instruct and train operators in the operations of equipment - Reading and interpreting diagnostic dashboards and analogue and digital display and devices

6.4 Condition assessment	
Definition	Must be able to execute processes and activities used by an organisation to assess the performance and health of its assets.
Key words	Facility assessment, Building assessment, State of asset
Behaviour considered competent	• Apply building codes and standards to buildings • Apply building inspection services • Apply building surveying practices and procedures • Evaluate service layout and connection methods • Assess structural requirements for buildings • Assess common hazards to public and personal safety associated with particular types of maintenance work in buildings • Limitations of work role, responsibility and professional abilities • Interpret SHE requirements
6.5 Cost estimating	
Definition	Must be able to interpret information and estimating the cost for short, medium and longer terms on all assets and services related to maintenance of assets. Must be able to determine and implement cost accounting methods and procedures.
Key words	Costing, Cost calculation, cost predications, financial estimates
Behaviour considered competent	• Knowledge of practices associated with the determination, estimation, and analysis of costs. • Skills required include data collection, cost estimating documentation, and evaluation of cost realism in proposals. • Prepare and evaluate construction cost estimates. • Gather detail and compile data to estimate all costs according to specifications. • Consider raw materials, labour, equipment, tools, labour and transportation for estimations. • Determine necessary resources for projects, based on cost estimates and budgetary constraints.
6.6 Fault and Incident Management	
Definition	The management of faults and incidents in a systematic manner. This includes determining the likelihood of failure, fault analysis, use of standard responses, temporary and permanent repairs as well as the taking over and handing back of sites.
Key words	Fault analysis; Repairs; Incidents; Failure; Determining the likelihood of failure; Condition monitoring; Failure event.
Behaviour considered competent	• Respond in time to incidents and failures. • Monitors and detects faults. • Conduct fault analysis and proceed with best way forward. • Can effectively make decisions in stressful situations. • Manage the fault and incident events in a systematic manner. • Manage and update the risk register. • Analyse, review and update safety plan. • Update and enforce standby roster. • Assign responsibilities based on standard responses. • Create and manage a communication plan. • Analyse, review and update response plans. • Apply advanced techniques when responding to faults or incidents. • Manage skilled staff when responding to faults or incidents. • Manage inventory in the emergency store. • Have comprehensive knowledge of the operating procedures of the organisations and business units. • Have in depth knowledge of equipment and components based. • Take care of all in-coming requests as well as carry out periodic or ad hoc activities. • Decide whether it is an incident that is to be handled by the team, when to handle it, creating workarounds, resolving the incident and communicating clearly about the progress made.

6.7 Identify components

Definition	The process of identifying an asset into its major element of construction. Building components with useful life in parentheses are: building structure, construction exterior and walls exterior, construction interior, building acquisition, roof covering, floor covering, heating and ventilating and cooling system, electrical and lighting system, fire protection, plumbing system, elevator system, fixed equipment assets and IT infrastructure.
Key words	Componentisation
Behaviour considered competent	- Identify components according to maintenance management planning guidelines - Using technology to capture components into systems - Identify components to component level for: - Building structure: Framing, exterior walls, roof, foundation and interior construction, as well as allocated design and architect fees - Building services: Electrical, HVAC, plumbing, and elevators - Fixed equipment: Laboratory benches, casework, fume hoods, environmental chambers, and emergency showers/eye wash stations - Understand the assembly/disassembly of components from its constituent parts. - Be able to draw a technical drawing of the components and its constituent parts. - The compilation of a product and specification breakdown structure. - The installation of components and the connection of components in its broader functional context and in line with the design/installation requirements in the Codes of Practice - Evaluation and comparison of components based on design requirements and characteristics of components. - The criticality of components in its broader context of components. - The identification of interfaces between components including such interface as electricity, water and sanitation. - Identification of components with different lifecycles. - Prioritisation of components in terms of the lifecycle and failure modes. - The development of specifications in line with product codes and safety requirements - The development of generic specifications in line with the product codes and legislation.

6.8 Interpretation of codes of practice

Definition	Must understand and have knowledge regarding the technical standards and legislation that includes processes for the identification, acceptable updating and compliance assurance of standards and legislations in the maintenance management context.
Key words	Compliance, Standards
Behaviour considered competent	- Interpret and execute codes of practice. - Be able to incorporate planning with codes of practice - Interpret and execute SANS compliance. - Develop, complete and update the register technical standards and legislation. - Develop specification and drawings for specific components in support of Terms of Reference or job card. - Develop Safety, Health and Environment (SHE) system and ensure compliance.

6.9 Lifecycle analysis	
Definition	Must be able to measure and manage a physical asset's useful life and determine and manage the total cost of ownership to best support the organisations business and mission.
Key words	Growth analysis, Lifecycle analysis
Behaviour considered competent	• Complete the evaluation process and criteria for their usage; including the level of detail required in relation to decision criticality and decision complexity • Take a multi discipline approach and the qualification of value, direct and indirect intervention cost, risk, performance, operating and maintenance cost. • Consider the system context of an asset, since the lifecycle of an individual item may be constrained by, or may contribute to, a different timescale of required performance or asset management responsibilities.
6.10 Reliability engineering	
Definition	Must ensure that an asset shall operate to a defined standard for a defined period of time in a defined environment. Must provide engineering support for manufacturing operations, technology and systems engineering and analyses new and existing products and establishes reliability programs to address reliability risks and meet quality requirements.
Key words	Facility engineering
Behaviour considered competent	• Analyse and identify product reliability requirements from within the organisation and from outside regulatory standards. • Participate in designing high-reliability products and applications to meet operational requirements. • Conduct reliability tests and experiments to check component performance; provide reliability data and findings for reliability analysis and improvement. • Perform risk assessments to improve device stability and reliability. • Calculate mean time between failures and determine lifecycle of product.

7. BUSINESS COMPETENCY DICTIONARY

7.1 Administration	
Definition	Must be able to execute administrative activities and procedures for the operation of an office or facility through organising and scheduling events, record keeping and effective communication with stakeholders.
Key words	Management, Supervising, Organising, Record management
Behaviour considered competent	• Obtain and file various records associated with maintenance management • Capture records associated with maintenance management • Categorising records associated with maintenance management • Schedule meetings and organise events • Manage maintenance call logs • Capture maintenance call logs

7.2 Basic accounting

Definition	Application of knowledge of the theory and practice of recording, classifying, examining and analysing data and records of financial transactions. The theories, principles, practices and terminology of accountancy are used in day to day activities.
Key words	Accounting, Accountancy, Debtors management, Creditors management
Behaviour considered competent	• Monitor and collect data to assess accuracy and integrity • Compile, monitor, examine, and audit various moderately complex financial statements/reports/accounts or budget codes for accuracy, integrity and conformance to accounting and program guidelines. • Develop, evaluate and implement changes to accounting systems and processes. • Identify substantive issues and thoroughly and accurately research and analyse them. • Interpret and evaluate results prepare documentation create financial reports and/or presentations • Demonstrate a proficient level of professional skill and/or knowledge in accounting and keep current with developments and trends. • Knowledge and ability to use applicable information technology and systems to meet work needs.

7.3 Budgeting and Financial Management

Definition	Must be able to plan the work-unit's budget and manage income and expenditure, through responsible implementation of policies, practices and decisions in order to achieve unit objectives effectively and efficiently.
Key Words	Budgeting; Financial Planning; Budget Analysis and Control
Behaviour considered competent	• Prepares work-unit budget required to achieve unit objectives. • Maintains internal control policies and processes in line with the Public Finance Management Act (PFMA) and National Treasury Guidelines and Best Practice Notes. • Prepares short-term (1 year) and longer-term (2-5 years) budget plans. • Ensures conformity with PFMA and auditing requirements. • Monitors revenue and expenditure for the purpose of sound fiscal responsibility. • Projects long-term financial requirements needed to achieve work-unit objectives. • Explains or justifies the work-unit budget to other stakeholders and departmental groups.

7.4 Business Analysis (Procedure development)

Definition	Must be able to measure and improve or upgrade work methods, procedures and systems and decrease costs in order to improve the quality and cost efficiency of services and products delivered to clients.
Key words	Work Method Improvement; Cost Efficiency; Productivity, Procedures, Processes
Behaviour considered competent	• Identifies areas and ways in which work methods can be improved. • Improves the effectiveness of work methods, systems and operational equipment by addressing operational costs, revenue expenditure and donor fund management. • Implements performance improvement through technological solutions, product development, services, business-unit planning, business process simplification and value-based management techniques. • Applies specialist knowledge of one area of business processes and understanding of related processes to produce work products. • Matches appropriate methods to identified improvement needs. • Maintains credibility and facilitates buy-in through effective discussions with primary stakeholders and sustained relationships with peers.

7.5 Mentoring and professional development

Definition	Must be able to develop and coach others and constructively review the work of others in order to improve and advance the skills, knowledge and performance levels of those who report to them.
Key words	Growth and development; Performance improvement; Skills development.
Behaviour considered competent	• Ensures and budgets for compliance with legislation and regulations that facilitates development. • Identifies competency gaps for subordinates and develops personal development plans for employees. • Identifies and effectively communicates work and performance expectations to work unit employees. • Comprehensively assesses the performance of individuals assigned to the work unit. • Gives detailed work instructions and/or on-the-job demonstrations. • Takes appropriate disciplinary and corrective action with employees for non-performance. • Provides planned on-the-job learning and skills development opportunities for subordinates.

7.6 Performance Improvement

Definition	Must be able to assess the performance in order to improve the performance of your assets, organisation, its members, and its external contributions to society. It's identifies the strengths and weakness in the overall performance improvement so that timely and appropriate action can be taken to support continual performance improvement.
Key words	Performance development, Performance enhancement
Behaviour considered competent	• Implement organisational and system-wide strategies for continuous quality improvement • Implement mechanisms to monitor and evaluate programs for their effectiveness and quality • Use evaluation results to improve performance • Integrate data and information to improve organisational processes and performance • Use cost-effectiveness, cost-benefit, and cost-utility analyses in programmatic prioritisation and decision making • Establish a performance management system • Ensure the measuring, reporting, and continuous improvement of organisational performance

7.7 Planning and organising

Definition	Must be able to plan and organise the work of the work unit and groups, using goal setting, objectives, targets, creating work schedules and work plans with associated budgets and resources, according to the organisation's procedures, in order to achieve the tasks, functions and results/outputs required of the work unit.
Key words	Schedule work; Organising; Allocate resources; Achieves results; Develop plans.
Behaviour considered competent	• Develops annual plans for the work unit. • Analyses goals and schedules component tasks accordingly. • Establishes priorities systematically. • Organises and prioritises tasks so they can be performed within the budget and to achieve the most efficient use of time. • Sequences activities and develop schedules. • Identifies and allocates resources. • Organises materials and equipment in order to undertake required tasks. • Translates objectives into specific plans. • Prepares clear plans and a strategic focus before starting to work on projects or implement initiatives. • Organises, prioritises and schedules tasks so they can be performed within budget and with the efficient use of time and resources. • Measures progress and monitors performance and results.

7.8 Procurement and Supply Chain Management

Definition	Must be able to ensure that all outsourced maintenance management activities are aligned with the maintenance management plan of the organisation and to monitor the outcomes of these activities against these objectives.
Key words	Acquisition, Supplier management, Quotations, Buying, Logistics.
Behaviour considered competent	• Knowledge, capabilities, and practices associated with each phase of the acquisition and contract management life cycle. • Strategic sourcing including long term planning, management of bids, contracts and catalogues. • Demand planning and forecasting including statistical forecasting, planning with bills of materials, macro calculation. • Safety clothing and equipment stock planning. • Supply network planning that includes capacity levelling, optimisation, multilevel supply and demand matching, subcontracting, aggregated supply network planning, distribution planning. • Distribution planning and responsive replenishment. • Service parts planning including tools, equipment and parts demand, inventory, supply, distribution and monitoring planning. • Purchase order processing and receive, verify and release invoices. • Distribution management • Move material, usually one organisation's finished goods or service parts, from the manufacturer or distributor downstream to the customer. • Transfer goods and services from the raw materials suppliers and producers to the end users or consumers. • Choose shipping methods, considering the trade-offs between costs and benefits. • Warehousing management • Receive, store, and ship materials to and from production or distribution locations by incorporating warehousing activities. • Configure warehouses to have formal storage locations that identify the row, rack section, level, and shelf location, typically with an alphanumeric location bar code or label. • Logistics management • Obtain and distribute materials and products in the proper places and in the proper quantities. • Apply logistics to the design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of material.

7.9 Project Management

Definition	Must be able to plan and manage projects by creating Work Breakdown Schedules (WBS), activity schedules, time scales and timelines with associated budgets in order to deliver projects on time, within cost and at the required quality level.
Key words	Project planning; Project execution and monitoring; Achieving project outputs.
Behaviour considered competent	• Define the project's scope and objectives and develop and write project charters. • Develop and write terms of reference (TORs) for projects. • Plan project or understand project plans produced from statements of work (SOW) or terms of reference (TORs). • Ability to assess the technical requirements needed to ensure delivery of and quality of services and products. • Ability to use contract instruments as necessary to ensure contract requirements are being met. • Plan resources (time, money, materials, consultants / service providers) for the execution of TORs or tasks. • Appoints service providers and implements, executes and monitors projects. • Re-plans or manages the re-planning of projects as part of daily project management. • Issues variation orders for projects that change scope or encounters unplanned for difficulties. • Produces or manages the production of project deliverables or outputs that are within budget and at the right quality levels. • Establishes broad stakeholder involvement and communicates the project status and key milestones. • Manages a project team of full-time staff with specialist capabilities in a specialised, technical area. • Develops the contract and in particular the technical approach to the project, the work description and scope for the project (or sub-project). • Assigns responsibilities, sets priorities, delegates tasks to others, and contributes needed resources, co-ordinates work efforts when necessary to produce deliverables. • Measures progress and monitors performance and results; keeps work on track. • Manages the financial performance of the project (e.g. monitoring hours and expenditure, variation orders, contribution versus amount billed, accounts payable, contractual obligations, appropriate sign-off, and value for money according to Treasury Regulations). • Manages and effects contractual changes and re-negotiates project terms of reference in a legally appropriate form. • Manages the risks identified and incorporates specific activities to overcome or reduce the risks.

7.10 Risk assessment and monitoring

Definition	Must be able to identify, quantifying and mitigating risk and exploit opportunities.
Key words	Danger, Hazard, Safety
Behaviour considered competent	• Identify, assess, analyse and treat risk and opportunities. • Generate and keep up to date risk management policies. • Execute risk management plans. • Analyse asset information and identify possible risks. • Develop mitigation plans for risk. • Monitor risk and mitigation plan. • Develop and update risk register.

7.11 Integration of organisational plans

Definition	To strategically plan maintenance and set maintenance objectives and goals while ensuring that maintenance, lifecycle, human resources, procurement and logistic plans aligns with organisational and asset management plans.
Key words	Maintenance, lifecycle, human resources, procurement and logistic plans.
Behaviour considered competent	• Strategic plans and other information are obtained and maintenance management issues analysed. • Roles and responsibilities associated with development of maintenance management plan are defined and documented. • Applicable industry, organisational and legislative requirements are interpreted and complied with. • Economic trends and market developments are identified and evaluated in terms of potential factors that may impact on asset management objective. • Comparative market data is obtained and analysis undertaken using standard financial analysis techniques. • Risks and contingencies are identified and quantified according to industry standards, precedents and techniques. • Key performance criteria for measuring the achievement of objectives and strategies are developed and incorporated into asset management plan. • Financial, physical and human resources to support the maintenance management plan are determined and organised within budget parameters. • Quality assurance goals and strategies are determined in consultation with relevant people. • Draft maintenance management plan and other relevant documentation are processed using business equipment and technology.

ANNEXURES

8. EXAMPLE: IMPLEMENTATION OF THE COMPETENCY DICTIONARY THROUGH ROLES

It stands to reason that a national department with provincial and regional offices will have a National Head of Maintenance, a Provincial Head of Maintenance and a Regional Head of Maintenance, while a typical provincial department will have a Provincial Head of Maintenance and Regional Heads of Maintenance. Generally this takes care of the size of portfolio that a role is responsible for as well.

The sphere of influence and complexity of an organisation will impact the requirements for maintenance management. The entity's job grading system (e.g. Hay or Equate) and the assessment of job descriptions evaluate both sphere of influence and complexity and associate that with the identification of qualification and experience required.

The purpose of these competency profiles however only provide input in what would be considered a competent person and does not take care of job size and content. That must still be determined by the method approved by the DPSA which is currently the "Equate" system.

Four example roles have been identified:

- National Head of Maintenance;
- Provincial Head of Maintenance;
- Regional Head of Maintenance; and
- Maintenance Supervisor.

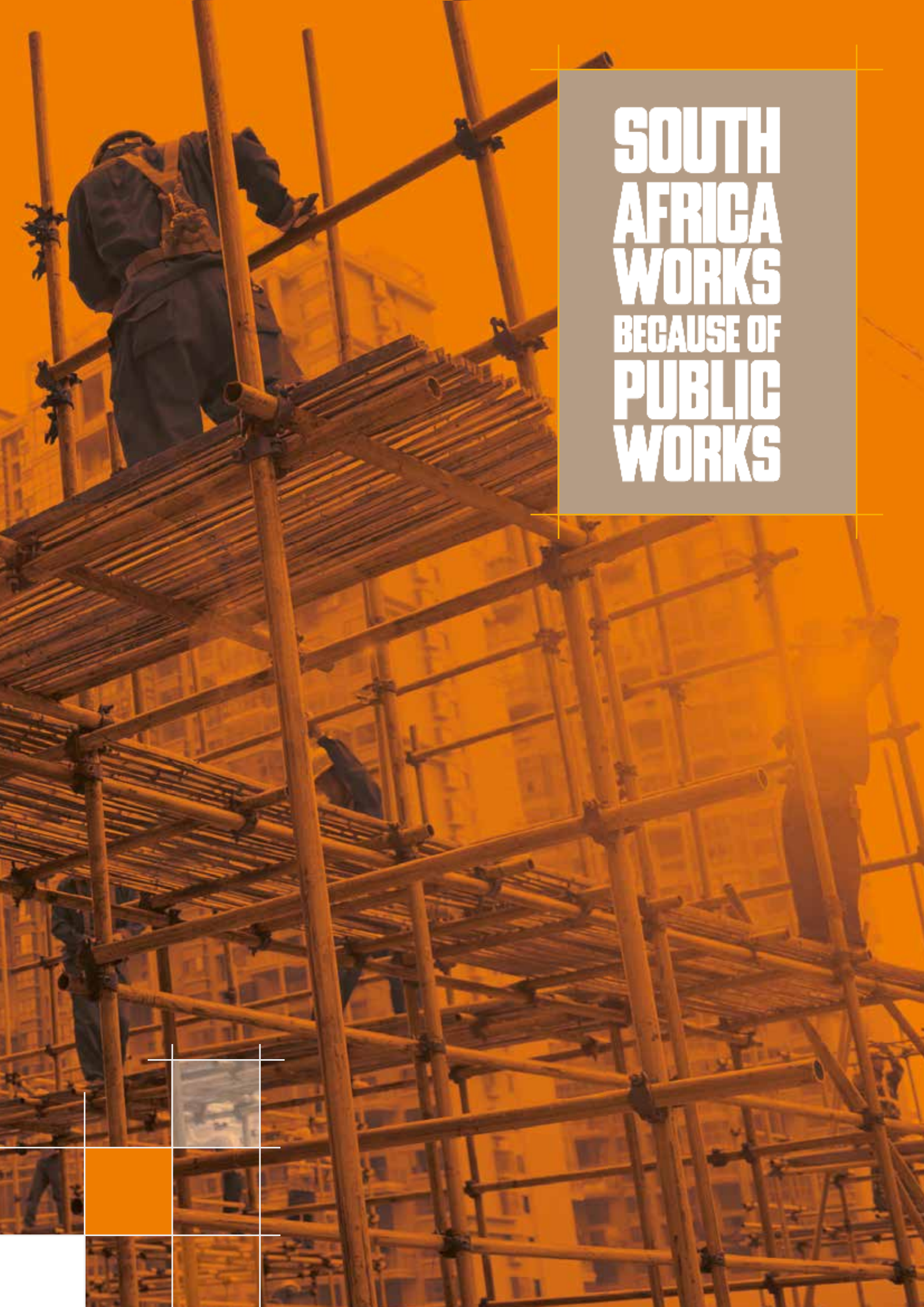
Different minimum National Qualifications Framework (NQF) levels for each competency are illustrated in the example below. Note that ideally the primary qualification should be technical example degree, building science, engineering etc., while secondary short courses in business is acceptable. However in terms of the SAQA qualification framework competency can also be recognised in terms of prior learning (RPL system).

TABLE A1: TECHNICAL AND BUSINESS COMPETENCIES

Group	Competency	National HOM	Provincial HOM	Regional HOM	Facility Supervisor
Technical	Identify components	>6	6	6	5
	Condition assessment		6	6	5
	Interpretation of codes of practice	>6	6	6	5
	Cost estimating	>6	6	6	5
	Fault and incident management		6	6	5
	Testing Components	>6	5	5	5
	Applying technology on maintenance management systems	>6	5	5	5
	Lifecycle analysis	>6			
	Reliability engineering	>6			

Group	Competency	National HOM	Provincial HOM	Regional HOM	Facility Supervisor
Business	Administration	>6	6	5	5
	Basic accounting	>6	6	5	5
	Budgeting and financial management	>6	6	5	5
	Business Analysis (Procedure development)	>6			
	Mentoring and professional development	>6			
	Performance Improvement	>6			
	Planning and organising	>6	5	5	5
	Procurement and supply chain management	>6	5	5	5
	Project management	>6	5	5	5
	Risk Assessment and monitoring	>6	5		
	Integration of organisational plans	>6	5	5	5

NOTES

A full-page background image of a construction worker on a wooden scaffolding. The worker is wearing a dark uniform and a safety harness, and is positioned on a high level of the scaffolding. The scaffolding is made of numerous wooden poles and cross-braces, creating a complex geometric pattern. In the background, a multi-story building with many windows is visible. The entire image has a strong orange tint. A large, semi-transparent grey rectangle is overlaid on the right side of the image, containing the text 'SOUTH AFRICA WORKS BECAUSE OF PUBLIC WORKS' in white, bold, sans-serif capital letters. The text is arranged in four lines: 'SOUTH', 'AFRICA', 'WORKS', and 'BECAUSE OF PUBLIC WORKS'. There are also some white geometric lines, including a crosshair, overlaid on the image.

SOUTH AFRICA WORKS BECAUSE OF PUBLIC WORKS

MAINTENANCE COMPETENCY FRAMEWORK

This publication is brought to you by The Department of Public Works and The Construction Industry Development Board (cidb). This book is **number five** in the following series:

1. Maintenance Management Standard
2. Maintenance Accounting Framework
3. Maintenance Monitoring and Evaluation Protocol
4. Maintenance Planning Guidelines
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