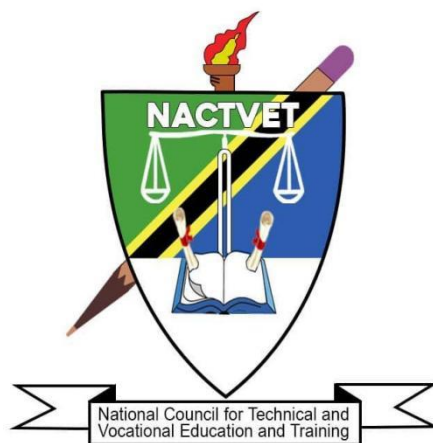


**NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND
TRAINING**



JANUARY 2023

PROPOSED OCCUPATIONAL STANDARDS

OCCUPATION: ARCHITECTURAL ENGINEERING TECHNICIAN

LEVEL: NTA 5

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ABBREVIATIONS

CAD	Computer-Aided Design
CBET	Competency Based Education and Training
HSE	HSE (Health, Safety and Environment) Management System
NACTVET	National Council for Technical and Vocational Education and Training
NOS	National Occupational Standards
TET	Technical Education and Training
TVET	Technical and Vocational Education and Training

GLOSSARY OF TERMS

Circumstantial Knowledge:	Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues.
Competence:	The ability to use knowledge, understanding, practical, and thinking skills to perform effectively to the workplace standards required in employment.
Competency:	A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.
Competency-based Education:	An instructional programme that derives its content from validated tasks and bases assessment on the learner's performance.
Curriculum:	A description or composite of statements about "what is to be learned" by the trainee/student in a particular instructional programme; a product that states the "intended learning outcomes".
Educational/Training Programme:	The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.
Occupation:	A specific position requiring the performance of specific tasks – essentially the same tasks are performed by all employees having the same title. (Example: baker)
Occupational Area:	This is a broad grouping of related jobs. (Example: food service)
Occupational Competence:	The application of knowledge and skills that consistently meet the standards required by the work context.
Occupational Standards:	Specific requirements of competences people are expected to demonstrate in a particular occupational area, including knowledge and relevant attitudes. They also act as a performance tool of assessment of the prescribed outcomes.
Occupational/Job Analysis:	A process used to identify the tasks that are important to employees in any given occupation.
Performance Criteria:	Indicate expected end results or outcomes in the form of evaluative statements.
Skills:	The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor.

Standards:	A set of statements, which if proved true under working conditions, means that an individual is meeting an expected level and type of performance.
Task Analysis:	The process of analysing each task to determine the steps, circumstantial knowledge, attitudes, performance standards, tools and materials needed, as well as safety concerns required for the employees performing it.
Task:	A work activity that has a definite beginning and ending, is observable or measurable, and consists of two or more definite steps that leads to a product, service, or decision.
Underpinning Knowledge:	Crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.
Verification Process:	The process of having experts review and confirm the importance of the task (competency) statements identified through occupational analysis. Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation.

1.0. INTRODUCTION

Technical Education and Training (TET) is one of the most important education sub-sectors in Tanzania, responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's *Development Vision 2025* intends to raise the country's economy to a middle-income status. This requires a skilled workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical Education has begun the job of drafting Occupational Standards that will eventually be adopted as National Occupational Standards for TET in order to ensure that it meets the needs of the labour market and the country's economic agenda.

National Occupational Standards (NOS) are performance criteria that are matched with labour market demands. Each National Occupation Standard describes functions, performance standards, and knowledge/understanding for one important function or task. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruiting, supervision, and appraisal, as well as TET standards. They're also helpful for benchmarking and harmonizing qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current, and consistent in delivery across all public and private institutions.

However, it must be noted that, Occupational Standards and Training standards/qualifications standards are different. Occupational standards are defined in terms of activities performed by a person in a selected occupation (e.g., an electrical engineer designs electrical circuits, performs troubleshooting in electrical circuits, etc.) and they are usually defined by employers following procedures agreed upon by all stakeholders. Education and training standards are developed from the activities defined in occupational standards, and they include learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him or her to function at an agreed level in an occupation. Education and Training standards are used to define curricula in training institutions. It is however critical that there must be a direct link between the occupational standards and the training standards to respond to the demands of the labour market.

In TET delivery, Tanzania adopted the Competence Based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge required to meet the occupational standards. Occupational standards are thus the starting point for developing competency-based training (CBET) programmes. TET institutions will be required to benchmark their curricula with relevant occupational standards.

Occupational Standards are developed based on a given occupation's current and future demands. As a result, they serve as a means of bridging the gap between the worlds of employment and technical education and training (TET).

The Architectural Engineering Technician Occupation has its own set of occupational standards. The document explains how the occupational standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

The Occupational standard development process began with an examination of major documents that guide Tanzanian skill development. The *10-year National Skills Development Strategy (2016-2026)* was one of the documents reviewed, and it outlined six (6) economic sectors that should be prioritized when developing skills development programmes.

These sectors include: Transport and Logistics, Tourism and Hospitality, Agribusiness, Construction, Energy and ICT. NACTE labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a workshop comprised of expert workers and educators with substantial knowledge and experience in the occupation conducted an occupational analysis utilizing the DACUM approach to produce the occupational profile. The analysis resulted in DACUM Charts, which are attached as **Appendix 1** to this document.

The occupational standards were then developed. Experts in Occupational Analysis and the Development of Occupational Standards facilitated the workshop. Interviews, online surveys, and a stakeholder forum were used to validate the Occupational Standards. Engineers, supervisory technicians on the job, and experienced Architectural Engineering Technicians were key informants in the survey to discover occupational trends. This information was used to gain insight from the workplaces regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation. A total of ... online surveys were completed by experts from the labour market across the country. Apart from the surveys aiding in defining the scope for the occupational analysis, they also served to engage a wide cross-section of experts in the occupation. Apart from this, the stakeholders' forum was attended by ... participants from different parts of the country representing various companies.

3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR ARCHITECTURAL ENGINEERING TECHNICIANS

The standards cover a broad range of duties and tasks that can be performed by an Architectural Engineering Technician. However, the occupational standards are not meant to replace individual

job descriptions. Instead, they are to be used for guidance in defining skill levels and knowledge for the technician in specific settings or positions. The Architectural Engineering Technician may perform tasks in a number of key areas of the occupational standards, but not necessarily in all areas. For example, in large operations, other individuals may be employed or designated to perform specific tasks.

The Architectural Engineering Technician shall assist the witness sampling of construction materials, implement basic surveying and laying out, and execute site work of the project under the supervision of engineers. At the construction site, the technician completes the site foundation rod sounding, building material witness sampling, implements the site leveling measurement and laying out, site 500/1,000 control cable, carries out the shallow foundation excavation of simple works, formwork configuration, reinforcement processing and binding, concrete pouring, brick wall masonry, and waterproofing paving and so on. Generally, the Architectural Engineering Technician performs the following responsibilities:

- a) Site foundation rod sounding
- b) Witness sampling of building materials
- c) Measurement of site leveling and laying out
- d) Implementation of site 500/1,000 control cable
- e) Shallow foundation excavation
- f) Formwork configuration
- g) Reinforcement processing and tying
- h) Concrete preparation and pouring
- i) Wall masonry
- j) Waterproofing membrane laying

The Occupational standards have been clustered into NTA qualification levels i.e. NTA level 4, 5 and 6.

4.0. VALIDITY PERIOD

Due to the rapid development of technology, the validity period of occupational standards is 3-5 years. The review will proceed in the same manner as the one before it, with new occupational standards being developed based on current trends of the labour market.

5.0. OCCUPATIONAL STANDARDS

5.1 OCCUPATIONAL STANDARDS FOR ARCHITECTURAL ENGINEERING TECHNICIANS - NTA 5

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF THE PROJECT CONSTRUCTION PLAN	DUTY NO.	501
TASK TITLE	IMPLEMENTATION OF THE PROJECT SCHEDULE	TASK NO.	5011
PERFORMANCE CRITERIA	The person performing this task must be able to implement the construction work crew schedule plan in accordance with the standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed on site under the supervision of senior technicians and architectural engineers. The tools and equipment to be used include: 1. Computers, stationery, standards and manuals and office furniture.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Prepare monthly operation plan; 2. Track the implementation of the progress plan and record the actual progress; 3. Implement construction contract commitments for progress, starts and extensions, suspensions, delays, and completion of work; 4. Follow up the image progress on the quantity of work, total value of output, labour consumed, materials and machinery units, etc; 5. Complete construction records and construction progress statistics; 6. Implement measures to control progress; 7. Process progress claims.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Issue construction task orders, including construction task orders, limited quantity purchase orders, and time sheets; 1.2 Do a good job in the deployment of construction work. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Principles of construction and civil engineering flow operations; 2.2 Measures for construction project schedule control; 2.3 The main task of construction project schedule control. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Principles of construction and civil engineering flow operations; 3.2 Network planning methods for construction and civil engineering; 3.3 Methods for dynamic control of construction and civil engineering progress;	

	3.4 Methods of drawing crosswalk diagrams. 4.0 Essential Skills 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Computer skills; 4.4 Analysis skills; 4.5 Creativity; 4.6 Adaptability; 4.7 Time management. 5.0 Math Skills 5.1 Math skills in the areas of algebra and calculus.
DESCRIPTION OF THE END PRODUCT / SERVICE	Progress analysis reports are formed in accordance with standards and guidelines approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Occupational health and safety; 2. Double code network technology; 3. Single code network technology; 4. Time-scale network planning techniques.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF THE PROJECT CONSTRUCTION PLAN	DUTY NO.	501
TASK TITLE	IMPLEMENTATION OF THE PROJECT RESOURCE PLAN	TASK NO.	5012
PERFORMANCE CRITERIA	The person performing this task must be able to implement the construction work crew resource plan in accordance with the standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed at construction sites under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Computers, stationery, standards and manuals and office furniture.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Gather information on production schedules for all aspects of construction; 2. Determine the requirements for labour, mechanical equipment, and materials for each phase of construction; 3. Track, inspect, collect and collate information on the arrival of labour, machinery and equipment, materials and components; 4. Compare actual data with resource plan; 5. Analyse the implementation of the resource plan; 6. Take appropriate measures to correct or adjust plans for resulting resource changes; 7. Check the implementation of measures; 8. Communicate with supervisors in a timely manner on the implementation of the resource plan.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Track the implementation of the resource plan and record actual resource availability; 1.2 Implement the commitments made in the construction contract for the supply of manpower, materials, machinery, technology and finance; 1.3 Implement measures to control the supply of resources; 1.4 Periodically analyse the availability and use of resources; 1.5 Identify issues of resource availability and utilization for continuous improvements. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Elements of resource control for construction projects; 2.2 Specification of resource control for construction projects; 2.3 Measures for construction project resource control; 2.4 The main task of construction project resource control. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Construction procedures for construction projects;	

	3.2 Construction measures for construction projects; 3.3 Elements of the construction project resource plan; 3.4 Measurement and pricing methods for construction project quantities; 3.5 The process of preparing and adjusting construction project plans. 4.0 Essential Skills 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Computer skills; 4.4 Analysis skills; 4.5 Creativity; 4.6 Adaptability; 4.7 Time management. 5.0 Math Skills 5.1 Math skills in the areas of algebra and calculus.
DESCRIPTION OF THE END PRODUCT / SERVICE	Progress analysis reports are formed in accordance with standards and guidelines approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Occupational health and safety.

OCCUPATION	CIVIL ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF THE CONSTRUCTION TECHNICAL SCHEME	DUTY NO.	502
TASK TITLE	PARTICIPATION IN THE TECHNICAL BRIEFING OF THE CONSTRUCTION WORK CREW	TASK NO.	5021
PERFORMANCE CRITERIA	The person performing this task must be able to deliver technical instructions for construction work crews in accordance with the standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed in offices under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Computers, stationery, standards and manuals and office furniture.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Interpret the construction drawings for sub-projects; 2. Explain the main processes; 3. Identify important quality control points; 4. Explain quality acceptance criteria; 5. Identify safety hazards in construction; 6. Explain risk control points; 7. Coordinate construction site cross work handling methods; 8. Rationalize the construction sequence based on the process.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Read and interpret construction drawings for sub-projects; 1.2 Select construction techniques and processes; 1.3 Perform inspection and acceptance in accordance with CQAC; 1.4 Inspect and control critical processes, quality control points. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Quality acceptance specification for construction of different structural works; 2.2 Criteria for building construction workmanship for different processes; 2.3 Technical specifications for construction safety; 2.4 Quality acceptance standards. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Knowledge of architectural and civil engineering drawing; 3.2 Building and civil engineering construction	

	technology; 3.3 Quality acceptance techniques for construction and civil engineering; 3.4 Knowledge of construction and civil engineering site safety management; 3.5 Construction techniques and processes. 4.0 Essential Skills 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Computer skills; 4.4 Analysis skills; 4.5 Creativity; 4.6 Adaptability; 4.7 Time management. 5.0 Math Skills 5.1 Math skills in the areas of algebra and calculus.
DESCRIPTION OF THE END PRODUCT / SERVICE	Technical delivery documents are formed in accordance with standards and guidelines approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Occupational safety and health.

OCCUPATION	CIVIL ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF THE CONSTRUCTION TECHNICAL SCHEME	DUTY NO.	502
TASK TITLE	IMPLEMENTATION OF TECHNICAL REVIEWS SUCH AS SURVEYING, REINFORCEMENT AND SCAFFOLDING	TASK NO.	5022
PERFORMANCE CRITERIA	The person performing this task must be able to perform technical reviews such as surveyings, reinforcement and scaffolding in accordance with standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed in the office and on the construction site under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Measuring equipment, computers, stationery, standards and manuals and office furniture.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Calibrate and review measurement control points; 2. Calibrate and review site axes, edges, and red line survey control points; 3. Review the quantity, type, and kind of reinforcement for correspondence with the drawings; 4. Review the tying of the reinforcement in accordance with the drawings; 5. Work with the supervising engineer to verify the quality of reinforcement ties and the correct type of jointings; 6. Sample and send reinforcement on-site; 7. Review that scaffolding is laced in accordance with safety code requirements; 8. Review scaffold erection materials for code compliance; 9. Review that scaffolding is connected in accordance with safety code requirements; 10. Verify that scaffolding construction workers are licensed; 11. Supervise scaffolding construction operators for compliance with safety code requirements.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Use instrumentation to measure the location of control points; 1.2 Survey control points; 1.3 Compare the drawings with the site to confirm the location of axes, sidings, and red lines; 1.4 Calculate the amount, type, and kind of reinforcementar required; 1.5 Tie the reinforcement; 1.6 Test the quality of the reinforcement ties and the jointing ways; 1.7 Sample and deliver to the reinforcement site; 1.8 Review scaffolding step spacing, span spacing, and connection safety in accordance with specifications. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Quality acceptance specification for construction of different structural works; 2.2 Criteria for building construction workmanship for different processes; 2.3 Construction scaffolding erection code; 2.4 Technical specifications for construction safety.	

	3.0 Theories The person performing this task must be able to explain the following: 3.1 Methods of building and civil engineering surveying; 3.2 Knowledge of reinforcement work in construction and civil engineering; 3.3 Knowledge of construction and civil engineering scaffolding works; 3.4 Measurement methods for control points; 3.5 Reinforcement tying and lapping methods. 4.0 Essential Skills 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Computer skills; 4.4 Analysis skills; 4.5 Creativity; 4.6 Adaptability; 4.7 Time management. 5.0 Math Skills 5.1 Math skills in the areas of algebra and calculus.
DESCRIPTION OF THE END PRODUCT / SERVICE	Technical review documents for surveying, reinforcement, scaffolding are formed in accordance with on-site reviews.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Occupational safety and health.

OCCUPATION	CIVIL ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF THE CONSTRUCTION TECHNICAL SCHEME	DUTY NO.	502
TASK TITLE	IMPLEMENTATION OF CONSTRUCTION PROCESS INSPECTIONS	TASK NO.	5023
PERFORMANCE CRITERIA	The person performing this task must be able to perform construction process inspections in accordance with standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed on the construction site under the supervision of senior technicians and architectural engineers. The tools and equipment to be used include: 1. Measuring tools, stationery, site record sheets, etc.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Supervise construction crews in the execution of construction processes in accordance with the construction program; 2. Check the sequence of construction processes; 3. Check the process flow for compliance with site specifications; 4. Inspect site construction safety and safe working conditions; 5. Promote safe construction without unauthorized work.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Execute construction processes in accordance with specifications and construction programs; 1.2 Enforce safe construction practices and conduct safe work inspections; 1.3 Check for unauthorized operations; 1.4. Publicize safe construction regulations. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Criteria for building construction workmanship for different processes; 2.2 Quality acceptance specifications for different processes of building construction; 2.3 Safe construction practices for different processes. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Building and civil engineering construction process flow; 3.2 Building and civil engineering construction work management processes; 3.3 Construction management technical measures.	

	4.0 Essential Skills 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Computer skills; 4.4 Analysis skills; 4.5 Creativity; 4.6 Adaptability; 4.7 Time management. 5.0 Math Skills 5.1 Math skills in the areas of algebra and calculus.
DESCRIPTION OF THE END PRODUCT / SERVICE	Construction process inspection record documents are formed in accordance with the construction process.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Occupational safety and health.

OCCUPATION	CIVIL ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF THE CONSTRUCTION TECHNICAL SCHEME	DUTY NO.	502
TASK TITLE	ASSISTANCE IN INVESTIGATING AND ANALYSING QUALITY ACCIDENTS	TASK NO.	5024
PERFORMANCE CRITERIA	The person performing this task must be able to assist in the investigation and analysis of quality incidents in accordance with the standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed in the office and on the construction site under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Computers, stationery, standards and manuals and office furniture.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Timely report engineering quality accidents in accordance with the process; 2. Assist in restoring the accident; 3. Assist in the investigation of the causes and processes of quality accidents, the severity of the accidents and economic losses; 4. Inspect and accept the completion of the accident treatment and solve work quality issues; 5. Prepare information on the quality inspection process.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Define construction quality control points; 1.2 Inspect the site; 1.3 Supervise the engineering quality; 1.4 Timely detect quality problems to avoid quality accidents. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Quality defect rectification measures and process standards; 2.2 Quality check criteria; 2.3 Quality standards for quality work; 2.4 Safe construction practices. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Categories of common quality problems; 3.2 Causes of common quality incidents; 3.3 Remedial measures for common quality incidents; 3.4 Process for handling quality incidents.	

	4.0 Essential Skills 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Computer skills; 4.4 Analysis skills; 4.5 Creativity; 4.6 Listening skills; 4.7 Leadership skills; 4.8 Motivation skills; 4.9 Adaptability; 4.10 Time management.
DESCRIPTION OF THE END PRODUCT / SERVICE	The quality and safety of construction activities in construction and civil engineering are monitored in accordance with norms and methods approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Scope of duties; 2. Occupational safety and health.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	COLLECTION OF PROJECT RESOURCE INFORMATION	DUTY NO.	503
TASK TITLE	COLLECTION OF EMPLOYMENT INFORMATION FOR LABOUR, MATERIALS, AND MACHINERY ON CONSTRUCTION SITES	TASK NO.	5031
PERFORMANCE CRITERIA	The person performing this task must be able to collect labour, material and machinery employment information in accordance with the project resource plan developed by the project manager.		
RANGE STATEMENT	The task can be performed in the office and on the construction site under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Computers, stationery, standards and manuals and office furniture.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Sign the subcontract for labour services, and assess and evaluate the on-site construction management of labour teams; 2. Participate in or supervise the signing, alteration, cancellation and termination of labour contracts for labourers and their participation in social insurance; 3. Collect information on the identity and qualifications of labour subcontractors, etc. 4. Collect labourers' entry and exit and employment; 5. Collect information on the settlement of labour charges; 6. Collect information on the payment of wages to labourers; 7. Collect information on labour disputes and workplace disputes; 8. Collect labour service worker data; 9. Aggregate, organise and transfer labour management information.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Be responsible for or oversee labour entry and exit and employment management; 1.2 Be responsible for the collection and organisation of labour settlement information, and participate in the settlement of labour fees; 1.3 Participate in or supervise the payment of wages to labourers, and to be responsible for the public announcement of labourers' wages and the establishment of accounts; 1.4 Participate in the mediation and handling of labour disputes and the follow-up of workplace accidents. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Personnel management measures of the construction site; 2.2 Wages, bonuses, mobility management and labour protection and welfare systems in construction enterprises; 2.3 National laws and regulations related to engineering construction. 3.0 Theories	

	The person performing this task must be able to explain the following: 3.1 Classification of construction site workers; 3.2 Basic knowledge of engineering financial management; 3.3 Basic knowledge of subcontracting management, labour contracts, wage payment and rights protection; 3.4 Fundamentals of human resource development and management; 3.5 Basic knowledge of social security. 4.0 Essential Skills 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Computer skills; 4.4 Analysis skills; 4.5 Creativity; 4.6 Listening skills; 4.7 Leadership skills; 4.8 Motivation skills; 4.9 Adaptability; 4.10 Time management. 5.0 Math Skills 5.1 Math skills in the areas of algebra and calculus.
DESCRIPTION OF THE END PRODUCT / SERVICE	The employment information detailed record form for construction and civil engineering are monitored in accordance with norms and methods approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1 Occupational health and safety.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	COLLECTION OF PROJECT RESOURCE INFORMATION	DUTY NO.	503
TASK TITLE	ACCEPTANCE AND MANAGEMENT OF INCOMING MATERIALS	TASK NO.	5032
PERFORMANCE CRITERIA	The person performing this task must be able to inspect and accept, store, maintain, issue and supervise the use of incoming materials in accordance with the project resource plan developed by the project manager.		
RANGE STATEMENT	The task can be performed on the construction site and in the office under the supervision of senior technicians and architectural engineers. The tools and equipment to be used include: 1. Computers, stationery, standards and manuals and office furniture.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Be responsible for the acceptance, labeling, storage, custody and issuance of all incoming materials; 2. Be responsible for quality acceptance, recording and labeling of incoming materials; 3. Timely convey the quality certificates, certificates of conformity and other information of the materials to relevant persons; 4. Mark and record materials approved by the project chief engineer at the emergency release; 5. Be responsible for the handling, storage, custody, maintenance and stacking management of incoming materials for ensuring that unqualified materials would not be used in the project; 6. Establish a sound construction site materials management account and quality records that demonstrate effective control of materials.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Check the surface quality of incoming materials, including whether the specifications, models, quantities and brands of materials comply with the requirements of the procurement contract and samples; 1.2 Collect proof of conformity and hand over to the tester as scheduled; 1.3 Witness the sampling of incoming materials and the delivery of samples; 1.4 Check the quality of incoming materials for compliance with contractual agreements and material acceptance standards; 1.5 Timely dispose of any problems identified during the acceptance process. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Quality acceptance criteria for materials; 2.2 System for receiving, storing and issuing materials. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Classification and characteristics of construction materials;	

	3.2 Contents and procedures of materials management; 3.3 Fundamentals of materials procurement; 3.4 Forms and manners of procurement of materials. 4.0 Essential Skills 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Computer skills; 4.4 Analysis skills; 4.5 Creativity; 4.6 Listening skills; 4.7 Leadership skills; 4.8 Motivation skills; 4.9 Adaptability; 4.10 Time management. 5.0 Math Skills 5.1 Math skills in the areas of algebra and calculus.
DESCRIPTION OF THE END PRODUCT / SERVICE	The acceptance, storage, custody, issuance and supervision of incoming materials are carried out in accordance with standards and guidelines approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Occupational health and safety.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	COLLECTION OF PROJECT RESOURCE INFORMATION	DUTY NO.	503
TASK TITLE	INFORMATION COLLECTION ON PROJECT COST OBJECTIVES	TASK NO.	5033
PERFORMANCE CRITERIA	The person performing this task must be able to plan, control and collect cost information in accordance with the cost target plan developed by the project manager.		
RANGE STATEMENT	The task can be performed in the office and on the construction site under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Computers, stationery, standards and manuals and office furniture.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Determine and plan for the type, amount, and timing of inputs of resources required in the engineering project; 2. Develop resource availability plans for the project; 3. Collect information on project resource availability plans and resource pricing; 4. Calculate the costs incurred during the construction process; 5. Prepare the project cost control plan in accordance with cost objectives; 6. Check and confirm the increase or decrease in the quantity of work caused by the change; 7. Compare the actual amount of cost accomplished with the planned, fixed and budgeted targets to evaluate the achievement and level of cost management; 8. Seek ways to reduce costs and save money by analysing cost completion in projects; 9. Check and control the disbursement of project funds; 10. Participate in the as-built settlement; 11. Collect and organise project information and quality records.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Select the cost control methods applicable to the project and strengthen the dynamic cost control of the project; 1.2 Analyse costs; 1.3 Make adjustments to the cost control program. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Cost accounting methods, processes and systems; 2.2 Knowledge of national finance and taxation and other related laws and regulations. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Components of project costs; 3.2 The form of project costs; 3.3 Method of engineering project cost control; 3.4 Strategies for cost control in engineering projects. 4.0 Essential Skills 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Computer skills; 4.4 Analysis skills;	

	4.5 Creativity; 4.6 Listening skills; 4.7 Leadership skills; 4.8 Motivation skills; 4.9 Adaptability; 4.10 Time management. 5.0 Math Skills 5.1 Math skills in the areas of algebra and calculus.
DESCRIPTION OF THE END PRODUCT / SERVICE	Information on the cost of labour, materials, machinery usage and overhead is collected in accordance with the standards and guidelines approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Occupational health and safety.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	INSPECTION OF PROJECT SECURITY	DUTY NO.	504
TASK TITLE	COMPLETION OF CONSTRUCTION SITE FENCING, TEMPORARY FACILITIES, SIGNAGE, CORPORATE CULTURE AND OTHER CONSTRUCTION LAYOUT	TASK NO.	5041
PERFORMANCE CRITERIA	The person performing this task must be able to perform all tasks such as the promotion of corporate culture, project site appearance, temporary facilities, and the promotion of safety warnings in accordance with the laws, rules, regulations, standards and management manuals approved by the competent authorities.		
RANGE STATEMENT	The task can be performed at the construction site of the building project under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Measuring equipment, computers, stationery, standards and manuals, and personal protective equipment.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Install the finalized site enclosure, inspect and accept the quality; 2. Implement site closure management; 3. Plan for on-site material stockpiling and protection standards; 4. Enforce construction site setup regulations; 5. Implement on-site materials management; 6. Check site office and accommodation normality; 7. Check on-site fire precautions; 8. Implement public signage; 9. Check the normality of life implementation.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Enforce on-site fencing requirements; 1.2 Provide on-site closed management facilities; 1.3 Set up temporary facilities such as offices and dormitories; 1.4 Install site safety warning signs, safety protection facilities. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Principle of standardization of signage; 2.2 Standard principles of material yardage neatness; 2.3 Principle of standardization of security facilities; 2.4 Principles of living facilities neatness standards; 2.5 Standards for setting up on-site fire protection, temporary facilities, and production facilities; 2.6 Principles and criteria for setting up temporary facilities. 3.0 Theories The person performing this task must be able to explain the following:	

	3.1 Construction processes and organisation plans for the engineering; 3.2 Construction closure management facilities, requirements. 4.0 Essential Skills 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Adaptability; 4.4 Analysis skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Closure management, temporary facilities, material stacking, and on-site warning signs at construction sites for building projects, and corporate culture are set up and constructed in accordance with laws, regulations, rules, standards, and management manuals approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Knowledge of occupational safety and health, safety and security.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	INSPECTION OF PROJECT SECURITY	DUTY NO.	504
TASK TITLE	INSPECTION OF CONSTRUCTION SITE MACHINERY AND EQUIPMENT, SAFETY PRECAUTIONS, UNAUTHORIZED WORK OF PERSONNEL	TASK NO.	5042
PERFORMANCE CRITERIA	The person performing this task must be able to inspect construction site machinery and equipment, safety precautions, and unauthorized work in accordance with laws, rules, regulations, standards, and management manuals approved by the competent authorities.		
RANGE STATEMENT	The task can be performed at the construction site of the building project under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Standards and manuals, measuring equipment, stationery, and personal protective equipment.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Check the proper use of construction machinery; 2. Check work-at-height protection; 3. Check the use of the safety helmet, safety belt and safety net; 4. Check hole edge protection; 5. Check construction sites for safe use of electricity; 6. Check vertical transportation equipment support; 7. Check for licensed special operators; 8. Check on the behavior of personnel working against the rules; 9. Record safety management activities and maintain due information.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Inspect construction machinery for safe operation and safety devices; 1.2 Check the "three treasures" (safety helmet, safety belt, and safety net), "four entrances" (stairway entrance, elevator shaft entrance, passageway entrance, and reserved opening), "five edges" (balcony edge, floor edge, roof edge, pit edge, and both sides of unloading platform) safety protection structure, measures, protection signs; 1.3 Inspect site for safe electrical installations; 1.4 Inspect site operators. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Building construction site scaffolding, safety protection, temporary electricity, machinery safety construction standards. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Construction project safety management;	

	3.2 Safe production technology measures. 4.0 Essential Skills 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Adaptability.
DESCRIPTION OF THE END PRODUCT / SERVICE	All inspections of machinery and equipment, safety and security, and personnel violations in projects at construction sites are accomplished in accordance with laws, regulations, rules, standards and management manuals approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Scope of duties; 2. Occupational safety and health.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	INSPECTION OF PROJECT SECURITY	DUTY NO.	504
TASK TITLE	IMPLEMENTATION OF EMERGENCY RESPONSE AND RESCUE DRILLS FOR SECURITY INCIDENTS	TASK NO.	5043
PERFORMANCE CRITERIA	The person performing this task must be able to perform emergency response and rescue drills for security incidents in accordance with laws, rules, regulations, standards and management manuals approved by the competent authorities.		
RANGE STATEMENT	The task can be performed at the construction site of a building project under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Standards and manuals, measuring equipment, safety gear, safety testing instruments, stationery, and personal protective equipment.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Participate in the preparation of safety emergency response plans; 2. Participate in the revision and improvement of safety emergency rescue plans; 3. Participate in the training and delivery of emergency response plans; 4. Configure facilities, equipment, safety protection equipment and related testing instruments for safety production; 5. Properly use production safety facilities, equipment, safety protection equipment and related testing instruments; 6. Implement emergency rescue drills; 7. Perform emergency rescue and recovery from accidents.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Identify and analyse risk sources an safety incidents types on building construction sites; 1.2 Prepare the security emergency plan; 1.3 Deliver methods of protection against security accidents; 1.4 Participate in emergency response knowledge and skills training; 1.5 Organize emergency rescue drills for security accidents. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Construction project safety management specification; 2.2 Principles of safe construction practices. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Basic emergency management knowledge and skills; 3.2 Emergency rescue measures; 3.3 Emergency plan system.	

	4.0 Essential Skills 4.1 Text preparation; 4.2 Communication skills; 4.3 Adaptability; 4.4 Computer application skills (spreadsheets).
DESCRIPTION OF THE END PRODUCT / SERVICE	Emergency response and rescue drills for project safety incidents at construction sites are completed in accordance with laws, rules, regulations, standards and management manuals approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Scope of duties; 2. Occupational safety and health.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	COLLECTION OF CONSTRUCTION INFORMATION	DUTY NO.	505
TASK TITLE	COLLECTION OF CONSTRUCTION INFORMATION	TASK NO.	5051
PERFORMANCE CRITERIA	The person performing this task must be able to collect construction data in accordance with laws, regulations, standards and management manuals approved by the competent authorities.		
RANGE STATEMENT	The task can be performed at the construction site of the building project under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Standards and manuals, measuring equipment, computers, stationery, and personal protective equipment.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Collect documentation of drawing review records; 2. Collect information related to the report on the commencement of works; 3. Collect technical and safety delivery record documents; 4. Collect construction log record documents; 5. Collect engineering survey record documents; 6. Collect documentation on the recording of engineering quality incidents; 7. Collect the as-built documentation for the project; 8. Collect factory certificates and incoming inspection reports for raw materials, components, finished products, semi-finished products and equipment; 9. Collect construction test records and witness inspection reports; 10. Collect documentation of concealed work acceptance records; 11. Collect handover inspection records; 12. Collect records of construction site quality management inspections; 13. Collect documents for quality acceptance records of test lots, sub-		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Collect and copy meeting minutes documents, construction, inspection and acceptance information, safety information, and delivery information; 1.2 Collect quality control information on project raw materials, components, finished and semi-finished products and equipment; 1.3 Collect construction quality acceptance data from construction sites. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Principles of construction data collection; 2.2 Specifications for the management of construction document files; 2.3 Construction process and acceptance process; 2.4 Basic emergency management knowledge and skills. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Requirements for information to be provided by parties involved in the project; 3.2 Ways and means of collecting information on	

projects and divisions; 14. Collect records of unit work quality completion and acceptance.	the project. 4.0 Essential Skills 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Computer application skills (spreadsheets); 4.4 Adaptability; 4.5 Time management; 4.6 Analysis skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The collection of project construction data at the construction site is accomplished in accordance with laws, rules, regulations, standards and management manuals approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Scope of duties; 2. Occupational safety and health.

TABLE 1: DACUM CHARTS FOR ARCHITECTURAL ENGINEERING TECHNICIAN - NTA 5

DUTIES	TASKS	ENABLERS
1.0 Implementation of the project construction plan	1.1 Implementation of the project schedule.	General skills and knowledge • Principles of construction and civil engineering flow operations • Network planning methods for construction and civil engineering • Methods for dynamic control of construction and civil engineering progress • Procedures and methods for construction projects • Elements of a construction project resource plan • Measurement and pricing of construction project quantities Tools and equipment • Computers • Stationery for on-site data collection and recording, etc. • Relevant industry standards and manuals • Safety helmets, safety shoes and other personal safety protection equipment Requirements for employees • Teamwork spirit • Integrity • Time management • Emphasis on commitment • Professional ethics • Adaptability • Respect
	1.2 Implementation of the project resource plan.	
2.0 Implementation of the construction technical scheme	2.1 Participation in the technical briefing of the construction work crew.	General skills and knowledge • Building and civil engineering construction process flow • Building and civil engineering construction work management process • Code of practice for safe construction of buildings and civil engineering works
	2.2 Implementation of technical reviews such as surveying, reinforcement and scaffolding.	
	2.3 Implementation of	

DUTIES	TASKS	ENABLERS
	construction process inspections.	• Quality defect rectification measures and process • Excellent communication and analytical skills Tools and equipment • Essential on-site measurement and sampling equipment • Computers • Stationery for on-site data collection and recording, etc. • Relevant industry standards and manuals • Safety helmets, safety shoes and other personal safety protection equipment Materials • Concrete • Reinforcement • Wood • Scaffold • Safety net, etc. Requirements for employees • Professional ethics • Teamwork • Integrity • Time management
	2.4 Assistance in investigating and analysing quality accidents.	
3.0 Collection of project resource information	3.1 Collection of employment information for labour, materials, and machinery on construction sites.	General skills and knowledge • Basic knowledge of subcontracting management, labour contracts, wage payment and rights protection • Fundamentals of human resource development and management • Classification and characteristics of construction materials • Contents and procedures of materials management • Cost accounting methods, processes and systems • Knowledge of national finance and taxation and other related laws and regulations
	3.2 Acceptance and management of incoming materials.	
	3.3 Information collection on project cost objectives.	

DUTIES	TASKS	ENABLERS
		Tools and equipment • Computers • Stationery for on-site data collection and recording, etc. • Relevant industry standards and manuals • Safety helmets, safety shoes and other personal safety protection equipment Materials • Concrete • Reinforcement • Wood • Scaffold • Safety net, etc. Requirements for employees • Teamwork spirit • Integrity • Time management • Emphasis on commitment • Professional ethics • Adaptability and respect
4.0 Inspection of project security	4.1 Completion of construction site fencing, temporary facilities, signage, corporate culture and other construction layout.	General skills and knowledge • Cooperation with others using communication skills and submission of reports to the superiors • Use of the Safety Inspection Standards Manual • Project safety inspection skills and knowledge • Skills and knowledge in measurement Tools and equipment • Essential on-site measurement and sampling equipment • Computers • Stationery for on-site data collection and recording, etc. • Relevant industry standards and manuals • Safety helmets, safety shoes and
	4.2 Inspection of construction site machinery and equipment, safety precautions, unauthorized work of personnel.	
	4.3 Implementation of emergency response and rescue drills for security incidents.	

DUTIES	TASKS	ENABLERS
		other personal safety protection equipment Materials • Concrete • Reinforcement • Wood • Scaffold • Safety net, etc. Requirements for employees • Professional ethics • Teamwork • Integrity • Time management • Adaptability • Analysis skills
5.0 Collection of construction information	5.1 Collection of construction information.	General skills and knowledge • Cooperation with others using communication skills and submission of reports to the superiors • Construction information management • Construction document file management Tools and equipment • Essential on-site measurement and sampling equipment • Computers • Stationery for on-site data collection and recording, etc. • Relevant industry standards and manuals • Safety helmets, safety shoes and other personal safety protection equipment Materials • Concrete • Reinforcement • Wood • Scaffold • Safety net, etc.

DUTIES	TASKS	ENABLERS
		Requirements for employees • Professional ethics • Teamwork • Integrity • Time management • Adaptability • Analysis skills