NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING

MAY 2023

PROPOSED OCCUPATIONAL STANDARDS

OCCUPATION: ARCHITECTURAL ENGINEERING TECHNICIAN

LEVEL: NTA 6

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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 of Tanzania
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 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: Transportation 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 work under the supervision of licensed architectural engineers. They can assist in the design of simple infrastructure of architectural engineering and provide information for the preparation of tender documents. Infrastructure may include buildings, bridges, highways, railroads, seaports, airports, canals, dams, water and wastewater systems, pipelines, waste disposal and recycling. These technicians also play an important role in the construction industry, working on tasks ranging from site assessment to quality control and problem solving during the construction phase. They also conduct site and laboratory tests. Generally, the Architectural Engineering Technician performs the following responsibilities:

a) Site and laboratory tests of architectural engineering materials
b) Construction and maintenance of the sites of construction projects
c) Construction and maintenance of water supply and sanitary engineering
d) Infrastructure survey for architectural engineering
e) Supervising architectural engineering
f) Providing information for the preparation of tender documents for construction and maintenance of architectural engineering
g) Design of simple infrastructure for architectural engineering.

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 TECHNICIAN - NTA 6

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	IMPLEMENTATION OF CONSTRUCTION ORGANISATION PLANS	**DUTY NO.**	601
TASK TITLE	IMPLEMENTATION OF CONSTRUCTION LAYOUT SCHEME	**TASK NO.**	6011
PERFORMANCE CRITERIA	The person performing this task must be able to carry out the plane layout of the construction sites, according to the construction organisation plans and the standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed in the offices and on the construction sites under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Computers, stationery, office furniture; 2. Measuring instruments; 3. Safety helmets, puncture-proof labour protection shoes.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Read and interpret the construction plans; 2. Collect the original data of the construction sites; 3. Submit the location and outline of the proposed buildings; 4. Arrange the location of transportation equipment such as tower cranes; 5. Arrange the location of mixing plants; 6. Arrange the location of material and component storage yards or warehouses; 7. Arrange the location of processing areas; 8. Arrange the location of roads for construction transportation; 9. Arrange the location of temporary facilities; 10. Arrange the water and electricity network for construction.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Read and interpret legends, scales, direction and wind vanes; 1.2 Inspect the construction sites; 1.3 Introduce the off-site roads and water and electricity for construction; 1.4 Locate buildings; 1.5 Lay out the construction facilities. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The principles of arranging construction sites; 2.2 The principles of construction site dynamic management; 2.3 Architectural engineering surveying and lay out specifications; 2.4 Construction sites management specifications; 2.5 Fire safety specifications; 2.6 Environmental and labour protection specifications; 2.7 Specifications for construction safety management.

	3.0 Theories The person performing this task must be able to explain the following: 3.1 Measurement methods for architectural engineering surveying; 3.2 Methods for architectural engineering positioning and laying out; 3.3 Methods for construction site reconnaissance. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork; 4.3 Overall planning and coordination; 4.4 Time management; 4.5 Calculating skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Construction sites layout is completed in accordance with the construction organisation plans and standards and guidelines approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Environmental protection and fire protection; 2. Occupational health and safety.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	IMPLEMENTATION OF CONSTRUCTION ORGANISATION PLANS	**DUTY NO.**	601
TASK TITLE	BREAKDOWN OF THE CONSTRUCTION PLAN	**TASK NO.**	6012
PERFORMANCE CRITERIA	The person performing this task must be able to break down the construction plan of the construction project, according to the construction organisation plans and the standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed in the offices and on the construction sites under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Stationery, office furniture; 2. Computers, printers; 3. Safety helmets, puncture-proof labour protection shoes.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Read and interpret construction drawings; 2. Read and interpret construction plans; 3. Divide the construction sections and determine the construction sequence; 4. Prepare the excavation and construction plans of earthworks and foundation pits; 5. Prepare the basic construction plans of foundations; 6. Prepare the engineering construction plans of the main projects; 7. Prepare the construction plans of decoration and installation; 8. Prepare the construction plans of each year, month and week; 9. Prepare the supply plans of building materials; 10. Prepare the supply plans of machinery and equipment; 11. Prepare labour arrangement plans.	**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 of building, structure and equipment; 1.2 Divide the construction sections; 1.3 Divide the construction stages; 1.4 Conduct statistics on resource demands; 1.5 Prepare resource supply plans. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principles of preparing construction plans; 2.2 Principles of breaking down architectural engineering; 2.3 Technical requirements for construction; 2.4 Statistical principles of construction resources. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Methods of preparing construction plans; 3.2 Methods of breaking down construction plans; 3.3 Methods of resource supply and demand statistics; 3.4 Circumstantial knowledge of partial and itemized

	projects; 3.5 Technical knowledge of construction; 3.6 Knowledge of construction organisation and management. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork; 4.3 Overall planning and coordination; 4.4 Time management; 4.5 Calculating skills; 4.6 Writing competence.
DESCRIPTION OF THE END PRODUCT / SERVICE	Construction plan is broken down in accordance with the construction organisation plans and 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	IMPLEMENTATION OF CONSTRUCTION ORGANISATION PLANS	**DUTY NO.**	601
TASK TITLE	COORDINATING RESOURCE APPROACH	**TASK NO.**	6013
PERFORMANCE CRITERIA	The person performing this task must be able to coordinate resource approach, according to the construction organisation plans and the standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed in the offices and on the construction sites under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Stationery, office furniture; 2. Computers, printers; 3. Safety helmets, puncture-proof labour protection shoes.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Prepare resource approach plans; 2. Purchase building materials; 3. Lease or order construction equipment; 4. Allocate different types of construction personnel; 5. Organise materials and equipment approach in accordance with construction plans; 6. Check, inspect and accept approached materials and equipment; 7. Store and manage the approached materials and equipment; 8. Establish ledgers of materials and equipment management; 9. Organise different types of construction personnel to enter the sites according to the construction plans; 10. Review the qualifications of construction personnel; 11. Train construction personnel; 12. Establish ledgers of construction personnel management.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Prepare plans; 1.2 Calculate statistics; 1.3 Check the production licenses, product certificates, technical standards, instructions, inspection reports, qualifications, certificates; 1.4 Check the appearance, size, weight, quantity, performance; 1.5 Conduct test run of mechanical equipment; 1.6 Prepare and manage ledgers. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principles of statistical analysis of data; 2.2 Principles of construction organisation; 2.3 Principle of construction management; 2.4 Laws and regulations of architectural engineering. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Methods of preparing plans and ledgers; 3.2 Methods of resource procurement, inspection,

	acceptance, storage and management; 3.3 Methods of operating and using construction equipment; 3.4 Methods of construction personnel management. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork; 4.3 Overall planning and coordination; 4.4 Time management; 4.5 Calculating skills; 4.6 Writing competence.
DESCRIPTION OF THE END PRODUCT / SERVICE	The approach of construction resources is completed in accordance with the construction organisation plans and 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	IMPLEMENTATION OF THE CONSTRUCTION TECHNICAL SCHEME	**DUTY NO.**	602
TASK TITLE	CHECK FOR THE ERRORS, OMISSIONS AND GAPS BETWEEN DRAWINGS	**TASK NO.**	6021
PERFORMANCE CRITERIA	The person performing this task must be able to check whether there is a correspondence between before and after, whether there are errors and omissions, and if there are errors and omissions, respond to the design unit in time according to the correlation between the drawings before and after.		
RANGE STATEMENT	The task can be performed in the office under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Computers, stationery, standards and design specifications, national laws and regulations, office furniture, drawings. The person performing this task must be able to have the drawing recognition competence.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Be familiar with standards and design specifications; 2. Be familiar with the national laws and regulations; 3. Check whether the geological exploration data are complete; 4. Check whether the design drawings and descriptions are complete; 5. Check whether there are any contradictions between professional drawings and vertical sectional drawings; 6. Check labels for omissions; 7. Check whether the geometric dimensions, plane position and elevation of general layout are consistent with the construction drawings.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Read the drawings and check for errors and omissions in them. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Geometric relationship between general layout and construction drawings; 2.2 Drawing specifications of vertical sectional drawings; 2.3 Drawing specifications of professional drawings. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Knowledge of architectural construction and drawing recognition; 3.2 Construction processes of architectural engineering; 3.3 Categories of architectural engineering materials;

	3.4 Construction technologies of architectural engineering; 3.5 Methods of the quality and safety management of architectural engineering; 3.6 Methods of construction project management. **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 Calculation and data processing competence.
DESCRIPTION OF THE END PRODUCT / SERVICE	Thorough inspections are conducted and errors and omissions are registered according to the standards and design specifications.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Scope of duties; 2. Occupational safety and health.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	IMPLEMENTATION OF THE CONSTRUCTION TECHNICAL SCHEME	**DUTY NO.**	602
TASK TITLE	IMPLEMENTATION OF THE TECHNICAL DISCLOSURE OF THE CONSTRUCTION WORK CREW	**TASK NO.**	6022
PERFORMANCE CRITERIA	The person performing this task must be able to implement the technical disclosure to each professional construction work crew according to the construction technical schemes.		
RANGE STATEMENT	The task can be performed in the office under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Computers, stationery, standards and design specifications, national laws and regulations, office furniture, drawings.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Understand the project characteristics and construction difficulties; 2. Understand the design intent and implement standards; 3. Understand the construction processes and methods, and the key points of construction operation; 4. Be familiar with safety and quality standards; 5. Be familiar with the drawing specifications; 6. Be familiar with construction processes and procedures; 7. Be familiar with safety and quality standards.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Be familiar with standards and design specifications; 1.2 Be familiar with the national laws and regulations. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Construction specifications for each process; 2.2 The contents, relationships, and relevant requirements of each process; 2.3 Key points and operational essentials of each process; 2.4 Working principles of construction machinery and equipment; 2.5 Specifications of the quality and safety management of architectural engineering; 2.6 Specifications of construction project management. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Architectural construction and drawing recognition; 3.2 Mechanical drawing and map reading; 3.3 Categories of construction materials;

	3.4 Construction processes of architectural engineering; 3.5 Types, structure and technical performance of construction machinery and equipment. **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 Calculation and data processing competence.
DESCRIPTION OF THE END PRODUCT / SERVICE	The project characteristics, construction difficulties, the contents, relationships, relevant requirements and the key points of operation are introduced according to the construction technical schemes.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Scope of duties; 2. Occupational safety and health.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	IMPLEMENTATION OF THE CONSTRUCTION TECHNICAL SCHEME	**DUTY NO.**	602
TASK TITLE	CHECKING THE RESULTS OF THE LAYING OUT MEASUREMENT	**TASK NO.**	6023
PERFORMANCE CRITERIA	The person performing this task must be able to use the measuring instrument to check the results of the laying out measurement according to the drawing coordinates or dimensions.		
RANGE STATEMENT	The task can be performed on the construction sites under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Drawings, level gauges, total stations, steel rulers, telemeter rod, lining poles, angularity testers, etc.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify the coordinates of the points on the drawings; 2. Identify the dimensions on the drawings; 3. Use the level gauge to check the results of laying out measurement; 4. Use the total station to check the results of setting out measurement.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Be familiar with the coordinates and dimensions on the drawings; 1.2 Use a measuring instrument to check the results of laying out measurement. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Methods of measuring distance with a steel ruler; 2.2 Principles of leveling survey; 2.3 Methods of coordinate measurement; 2.4 Specifications of the quality and safety management of architectural engineering; 2.5 Specifications of construction project management. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Knowledge of architectural construction and drawing recognition; 3.2 Construction processes of architectural engineering; 3.3 Measurement methods of architectural

	engineering; 3.4 Construction technologies of architectural engineering; 3.5 Underpinning knowledge of measurement. **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 Calculation and data processing competence.
DESCRIPTION OF THE END PRODUCT / SERVICE	The measuring instrument or tools are used to check the results of laying out measurement according to the coordinates and dimensions of the points on the drawings.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Scope of duties; 2. Occupational safety and health.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	INSPECTION OF CONSTRUCTION QUALITY AND PROBLEM SOLVING	**DUTY NO.**	603
TASK TITLE	IMPLEMENTATION OF THE PRE-CONTROL AND PROCESS CONTROL OF THE CONSTRUCTION QUALITY	**TASK NO.**	6031
PERFORMANCE CRITERIA	The person performing this task must be able to carry out the pre-control and process control of the construction quality according to the standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task will be performed on sites under the supervision of the chief engineer. The tools and equipment to be used include: 1. Office furniture, drawings, measuring tapes, measuring pens, measuring instruments, etc., strength testers, thermometers, hygrometers, photometers, theodolite, GPS equipment, level gauges, total stations, lining poles, etc.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Inspect and supervise the construction quality; 2. Develop and implement construction quality control plans; 3. Inspect and evaluate the working face of the construction sites; 4. Ensure that the construction process and quality meet the project management requirements; 5. Ensure that the construction process and quality meet customer requirements and contract agreements; 6. Train construction personnel.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Formulate construction quality control plans and quality supervision systems; 1.2 Implement the construction process flows. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Construction quality first principle; 2.2 Principle of full-process control of the construction quality; 2.3 Establish quality supervision systems; 2.4 Management specifications of the construction quality of architectural engineering; 2.5 Safety operation specifications of equipment and tools. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Knowledge of drawing reading; 3.2 Knowledge of engineering surveying; 3.3 Management knowledge of the construction quality of architectural engineering;

	3.4 Basic knowledge of quality inspection and acceptance. **4.0 Essential Skills** 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Computer skills; 4.4 Analysis skills; 4.5 Adaptability; 4.6 Time management.
DESCRIPTION OF THE END PRODUCT / SERVICE	The pre-control and process control of the construction quality are completed according to the standards and guidelines 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 CONSTRUCTION QUALITY AND PROBLEM SOLVING	**DUTY NO.**	603
TASK TITLE	IMPLEMENTATION OF PROCESS QUALITY INSPECTION AND ACCEPTANCE	**TASK NO.**	6032
PERFORMANCE CRITERIA	The person performing this task must be able to carry out the process quality inspection and acceptance according to the standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task will be performed on sites under the supervision of the engineer. The tools and equipment to be used include: 1. Office furniture, drawings, measuring tapes, measuring pens, measuring instruments, etc., strength testers, thermometers, hygrometers, photometers, theodolite, GPS equipment, level gauges, total stations, lining poles, etc.		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Check the construction process according to the standard requirements; 2. Inspect and accept the construction quality in time; 3. Calculate the acceptance rate of inspection and acceptance; 4. Check construction quality according to customer requirements.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Implement the construction process flows; 1.2 Implement quality inspection and acceptance; 1.3 Use the quality inspection equipment properly; 1.4 Calculate and record the acceptance rate. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Construction quality first principle; 2.2 Principle of full-process control of the construction quality; 2.3 Establish quality supervision systems; 2.4 Management specifications of the construction quality of architectural engineering. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Knowledge of drawing reading; 3.2 Knowledge of engineering surveying; 3.3 Management knowledge of the construction quality of architectural engineering; 3.4 Basic knowledge of quality inspection and

	acceptance. **4.0 Essential Skills** 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Computer skills; 4.4 Analysis skills; 4.5 Adaptability; 4.6 Time management.
DESCRIPTION OF THE END PRODUCT / SERVICE	The pre-control and process control of the construction quality are completed according to the standards and guidelines approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of equipment and tools; 2. Scope of duties; 3. Occupational safety and health.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	INSPECTION OF CONSTRUCTION QUALITY AND PROBLEM SOLVING	**DUTY NO.**	603
TASK TITLE	IMPLEMENTATION OF QUALITY IMPROVEMENT MEASURES	**TASK NO.**	6033
PERFORMANCE CRITERIA	The person performing this task must be able to put forward quality rectification measures according to the standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed on sites under the supervision of the engineer. The tools and equipment to be used include: 1. Office furniture, drawings, measuring tapes, measuring pens, measuring instruments, etc., strength testers, thermometers, hygrometers, photometers, theodolite, GPS equipment, level gauges, total stations, lining poles, etc.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Read and interpret construction drawings and specifications; 2. Develop and implement quality improvement plans; 3. Communicate and coordinate the quality improvement process; 4. Evaluate the effect of quality rectification and keep rectification records.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Develop and implement quality improvement plans; 1.2 Communicate and coordinate the quality improvement process; 1.3 Evaluate and record the effect of quality rectification. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Construction quality first principle; 2.2 Principle of full-process control of the construction quality; 2.3 Regular quality assessment and review specifications. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Knowledge of drawing reading; 3.2 Knowledge of engineering surveying; 3.3 Knowledge of the construction processes of architectural engineering; 3.4 Basic knowledge of quality inspection and acceptance.

	4.0 Essential Skills 4.1 Teamwork skills; 4.2 Communication skills; 4.3 Computer skills; 4.4 Data analysis competence; 4.5 Adaptability; 4.6 Time management.
DESCRIPTION OF THE END PRODUCT / SERVICE	The rectification of the construction quality is completed according to the standards and guidelines approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of equipment and tools; 2. Scope of duties; 3. Occupational safety and health.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	ALLOCATION OF THE PROJECT RESOURCES	**DUTY NO.**	604
TASK TITLE	PREPARATION OF THE LABOUR MANAGEMENT PLANS AND COSTS TARGET BREAKDOWN	**TASK NO.**	6041
PERFORMANCE CRITERIA	The person performing this task must be able to break down the costs targets, prepare labour management plans, allocate resources proportionally and put them into construction and production according to the project resource plans approved by the competent authorities.		
RANGE STATEMENT	The task can be performed in the office under the supervision of the engineer. The tools and equipment to be used include: 1. Computers, stationery, office furniture.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Determine monthly work plans, production tasks and labour quotas; 2. Prepare allocation plans of construction labour; 3. List the types and quantity of labour required and the period of employment; 4. Track the labour usage plans in real time; 5. Adjust the usage plans based on changes in production schedules and employee status; 6. Analyse the project costs using comparative method, factor analysis, difference calculation, and ratio method; 7. Break down the target costs of the projects according to three methods: total production schedule network node plan, monthly image schedule plan, direct costs and indirect costs of the construction projects. 8. Collect the actual value of the costs incurred and compare it to the target value in the process of project management; 9. Analyse the trend of the actual value, check whether there is any deviation,	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Prepare monthly labour usage plans in accordance with the construction and production schedules; 1.2 Adjust the labour plans in combination with the schedules; 1.3 Calculate the costs of the project; 1.4 Break down the project's target costs; 1.5 Manage the dynamic costs of the projects. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Principles of labour allocation calculation; 2.2 Principles of labour allocation optimization; 2.3 Enterprise costs scopes; 2.4 Principles of whole-process dynamic management; 2.5 Principles of PDCA objective management; 2.6 Principles of combining power, responsibility and profits; 2.7 Principles of construction project quotas. **3.0 Theories** The person performing this task must be able to explain the following:

find out the specific reasons, and take corresponding measures.	3.1 Knowledge of architectural construction and drawing recognition; 3.2 Construction processes of architectural engineering; 3.3 Knowledge of the measurement and valuation of architectural engineering; 3.4 Methods of engineering costs control and management; 3.5 Methods of construction project management; 3.6 Circumstantial knowledge of the architectural engineering economics. **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 Statistics; 5.2 Calculation and data processing competence.
DESCRIPTION OF THE END PRODUCT / SERVICE	The costs targets are broken down, the labour management plans are prepared, and the resource allocation is adjusted to meet the needs of production, according to the project resource plans approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of equipment and tools; 2. Scope of duties; 3. Occupational safety and health.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	ALLOCATION OF THE PROJECT RESOURCES	**DUTY NO.**	604
TASK TITLE	SELECTION, INSPECTION, ACCEPTANCE AND SAMPLING REINSPECTION OF THE APPROACHED MATERIALS AND EQUIPMENT	**TASK NO.**	6042
PERFORMANCE CRITERIA	The person performing this task must be able to conduct selection, inspection, acceptance and sampling reinspection of the approached materials and equipment according to the materials and machinery employment plans approved by the competent authorities.		
RANGE STATEMENT	The task can be performed on sites under the supervision of the engineer. The tools and equipment to be used include: 1. Computers, stationery, office furniture.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Visit the building materials and machinery markets, observe the market size, business distribution, product quality and price competition; 2. Collect and analyse data; 3. Inspect the appearance, physical properties, specifications and durability of building materials; 4. Complete the approach, acceptance and sampling reinspection of the materials; 5. Stack the building materials and items reasonably according to the characteristics of them and the classification of their using purpose; 6. Clean the storage areas regularly to keep materials in order; 7. Be familiar with the distribution and technical status of mechanical equipment according to production schedules; 8. Implement the registration of the use of mechanical equipment, and regularly contact the manufacturer to repair and maintain the machinery	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Analyse the market information of building materials; 1.2 Participate in the preparation of materials and equipment allocation plans; 1.3 Be responsible for collecting price information of materials and equipment, and participate in the evaluation and selection of supply units. 1.4 Be responsible for the reception, acceptance, inspection, sampling reinspection, and storage management of the approached materials; 1.5 Be responsible for the safe operation and maintenance of construction machinery and equipment. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Working principles of construction machinery and equipment; 2.2 Basic principles of material management; 2.3 Inspection and acceptance specifications of the approach materials.

and equipment.	**3.0 Theories** The person performing this task must be able to explain the following: 3.1 Categories of construction materials; 3.2 Methods of the measurement and valuation of architectural engineering; 3.3 Types, structure and technical performance of construction machinery and equipment; 3.4 Basic properties of engineering 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 Adaptability; 4.7 Time management. **5.0 Math Skills** 5.1 Statistics; 5.2 Calculation and data processing competence.
DESCRIPTION OF THE END PRODUCT / SERVICE	The selection, inspection, acceptance and sampling reinspection of the approached materials and equipment are conducted according to the materials and machinery employment plans approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of equipment and tools; 2. Scope of duties; 3. Occupational safety and health.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	ALLOCATION OF THE PROJECT RESOURCES	**DUTY NO.**	604
TASK TITLE	STATISTIC OF THE USAGE OF LABOUR AND CONSUMPTION OF MATERIALS AND MACHINERY ON CONSTRUCTION SITES	**TASK NO.**	6043
PERFORMANCE CRITERIA	The person performing this task must be able to conduct the statistic of the labour consumption of the labour, materials and machinery on the construction sites according to the standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed in the office under the supervision of the engineer. The tools and equipment to be used include: 1. Computers, stationery, office furniture and project documents.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Manage the entry and exit of labourers and employment; 2. Collect and sort labor settlement data; 3. Settle the labor charges; 4. Receive, release, store and manage approach materials and equipment; 5. Establish ledgers of materials and equipment management; 6. Count and check materials and equipment; 7. Prepare quotas of construction machinery and equipment; 8. Establish the ledgers of mechanical equipment; 9. Lease and settle construction machinery and equipment.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Manage labourers; 1.2 Collect and sort labor settlement data; 1.3 Receive, release, store and manage, take stock and count materials and equipment; 1.4 Establish the ledgers of machinery, material and equipment management; 1.5 Settle the costs of construction machinery and equipment. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Construction management specifications; 2.2 Technical requirements for the construction; 2.3 Principles of engineering quantity estimation; 2.4 Report writing specifications; 2.5 Principles of construction and organisation. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Technical processes of construction; 3.2 Quality and safety management of architectural engineering;

	3.3 Methods of the measurement and valuation of architectural engineering; 3.4 Methods of managing, preparing, collecting and sorting architectural engineering data; 3.5 The composition, technical properties and characteristics of building materials; 3.6 Types, structure and technical performance of construction machinery and equipment. **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.
DESCRIPTION OF THE END PRODUCT / SERVICE	The usage of labour and consumption of materials and machinery on construction sites are counted according to the standards and guidelines approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of equipment and tools; 2. Scope of duties; 3. Occupational safety and health.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	ALLOCATION OF THE PROJECT RESOURCES	**DUTY NO.**	604
TASK TITLE	MANAGEMENT OF THE ON-SITE CERTIFICATE GIVING, COLLECTION AND SORTING OF THE RELEVANT SETTLEMENT INFORMATION	**TASK NO.**	6044
PERFORMANCE CRITERIA	The person performing this task must be able to manage on-site certificate giving and collect and sort relevant settlement data according to the standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed in the office under the supervision of the engineer. The tools and equipment to be used include: 1. Computers, stationery, office furniture and project documents.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Establish ledgers of construction data, and disclose the construction data; 2. Collect, review and sort construction data; 3. File and archive design, give on-site certificates, sort and archive construction data on file; 4. Change design, give on-site certificates, sort and archive form ledgers; 5. Accept and hand over the construction data; 6. Establish construction data management systems.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Disclose, collect, review and sort construction data; 1.2 Set and archive case documents on file about the construction materials, and inspect, accept and transfer construction data; 1.3 Change design, give on-site certificates, sort and archive form ledgers; 1.4 Establish construction data management systems. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Construction management specifications; 2.2 Technical requirements for construction; 2.3 Principles of engineering quantity estimation; 2.4 Report writing criteria. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Knowledge of construction technologies and processes; 3.2 Principles of architectural construction organisation; 3.3 Quality and safety management of architectural engineering;

	3.4 Methods of the measurement and valuation of architectural engineering; 3.5 Methods of managing, preparing, collecting and sorting architectural engineering data; 3.6 The composition, technical properties and characteristics of building materials; 3.7 Types, structure and technical performance of construction machinery and equipment. **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.
DESCRIPTION OF THE END PRODUCT / SERVICE	The on-site certificate giving is managed and the relevant settlement data are collected and sorted according to the standards and guidelines approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Operation and use of construction equipment; 2. Scope of duties; 3. Occupational safety and health.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CONTROLLING PROJECT SAFETY	**DUTY NO.**	605
TASK TITLE	INSPECTION OF THE SAFETY CONDITIONS BEFORE STARTING, AND THE TECHNICAL DISCLOSURE OF THE CONSTRUCTION SAFETY	**TASK NO.**	6051
PERFORMANCE CRITERIA	The person performing this task must be able to conduct a full safety inspection according to laws and regulations and the standards approved by the competent authorities, and complete disclosure according to the safety technical document.		
RANGE STATEMENT	The task can be performed on the construction sites under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Necessary safety equipment; 2. Computers; 3. Stationery; 4. Office furniture.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Be familiar with the safety rules and regulations of the construction sites; 2. Check the protection for ground and deep pit operations; 3. Check the protection of high altitude and three-dimensional cross operations; 4. Check the safety of construction electricity; 5. Check the safety of mechanical equipment; 6. Check the measures to prevent accidents caused by natural disasters; 7. Check fire and explosion prevention measures.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Provide on-site guidance of ground and deep pit protection operations to workers; 1.2 Provide on-site guidance of high altitude and three-dimensional cross protection operations to workers; 1.3 Organise electricians to form working groups to investigate the safety hazards of on-site electricity use one by one; 1.4 Organise machinists to form working groups to investigate the safety hazards of mechanical equipment use one by one; 1.5 Prevent natural disasters and accidents; 1.6 Fire and explosion prevention. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Rules and regulations of work safety and regulations of construction sites safety; 2.2 Safety measures on construction sites. **3.0 Theories**

	The person performing this task must be able to explain the following: 3.1 Knowledge of engineering mechanics; 3.2 Methods of structural analysis; 3.3 Categories of architectural engineering materials; 3.4 Construction technologies of architectural engineering; 3.5 Architectural drawing and map recognition methods; 3.6 Quality and safety management of architectural engineering; **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 Emergency and first aid competences; 4.8 Time management. **5.0 Math Skills** 5.1 Calculus.
DESCRIPTION OF THE END PRODUCT / SERVICE	A full safety inspection is conducted according to laws and regulations and the standards approved by the competent authorities, and disclosure is completed according to the safety technical document.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of equipment and tools; 2. Scope of duties; 3. Occupational safety and health.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CONTROLLING PROJECT SAFETY	**DUTY NO.**	605
TASK TITLE	IDENTIFICATION OF HAZARD SOURCES AND THE RECORD OF WORK SAFETY SITUATIONS	**TASK NO.**	6052
PERFORMANCE CRITERIA	The person performing this task must be able to identify the hazard sources of the architectural engineering according to the hazard identification lists, and record the safety situation in the production and construction process in detail.		
RANGE STATEMENT	The task can be performed on the construction sites under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Necessary safety equipment; 2. Computers; 3. Stationery; 4. Office furniture; 5. Hazard sources identification lists of architectural engineering.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Memorize the hazard sources identification lists of architectural engineering; 2. Conduct safety education and training for all practitioners according to the lists of hazard sources; 3. Conduct regular site safety inspection according to the hazard sources lists; 4. Establish the mechanism of hazard identification and rectification of hidden hazards, and discover and rectify hidden hazards in time; 5. Establish emergency plans and exercise mechanisms; 6. Establish special operation personnel management mechanisms, such as working with certificates, training regularly and health examination.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Identify hazard sources; 1.2 Record work safety situations. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Rules and regulations of work safety and regulations of construction sites safety; 2.2 Safety measures on construction sites. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Engineering mechanics; 3.2 Structure analysis; 3.3 Architectural engineering materials; 3.4 Construction technologies of architectural engineering; 3.5 Architectural drawing and map recognition; 3.6 Quality and safety management of architectural engineering;

	3.7 Electrician technique; 3.8 Mechanical foundation; 3.9 General chemistry; 3.10 Safety monitoring technology. **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 Emergency and first aid competences; 4.8 Time management. **5.0 Math Skills** 5.1 Calculus.
DESCRIPTION OF THE END PRODUCT / SERVICE	Special documents on the list of hazard sources are formed, several mechanisms are implemented and documents, including safety education and training, accident hazard identification and rectification, emergency plans and drills, special personnel management, work safety responsibility systems, are formed.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safety operation of equipment and tools; 2. Scope of duties; 3. Occupational safety and health.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CONTROLLING PROJECT SAFETY	**DUTY NO.**	605
TASK TITLE	HANDLING ILLEGAL OPERATIONS AND SAFETY HAZARDS	**TASK NO.**	6053
PERFORMANCE CRITERIA	The person performing this task must be able to inspect the safety of construction operations and fire safety, and handle the illegal operations and safety hazards according to the specifications and methods approved by the competent authorities.		
RANGE STATEMENT	The task can be performed on the construction sites under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Necessary safety equipment, computers, stationery, standards and design specifications, national laws and regulations, architectural engineering hazard sources identification lists, office furniture, etc.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Conduct on-site safety inspection; 2. Issue hazard records according to safety inspection; 3. Issue safety hazard notices after inspection; 4. Point out the violation of the inspection of the command and the violation of the operation on the spot, and correct them within a time limit; 5. Follow up and verify the implementation process of corrective and preventive measures; 6. Prepare monthly safety activity plans; 7. Organise health, safety and environmental activities; 8. Keep verification records.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Take proper measures to control and eliminate safety hazards; 1.2 Supervise and guarantee the health and safety environment construction of the projects; 1.3 Issue safety hazard notices; 1.4 Track and verify and rectification, and correct processes; 1.5 Make good safety records and urge the workshops and teams to have good pre-shift meetings. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Site safety management specifications; 2.2 Principles for handling accidents; 2.3 Causing principles of security accidents; 2.4 Safety regulations; 2.5 Risk assessment principles. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Safety management knowledge; 3.2 System safety analysis; 3.3 Common sense of safety principles;

	3.4 Types of hazards; 3.5 Common hazard sources and possible hazards and safety 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 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 field of algebra; 5.2 Computing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The safety of construction operations and fire safety are inspected, and the illegal operations and safety hazards are handled according to the specifications 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	CONTROLLING PROJECT SAFETY	**DUTY NO.**	605
TASK TITLE	CARRYING OUT SAFETY EDUCATION AND TRAINING, AND ORGANISING SAFETY ACCIDENT EMERGENCY AND RESCUE DRILLS	**TASK NO.**	6054
PERFORMANCE CRITERIA	The person performing this task must be able to identify the hazard sources of the architectural engineering according to the hazard identification lists, and record the safety situation in the production and construction process in detail.		
RANGE STATEMENT	The task can be performed on the construction sites under the supervision and guidance of the engineers. The tools and equipment to be used include: 1. Necessary safety equipment, computers, stationery, standards and design specifications, national laws and regulations, architectural engineering hazard sources identification lists, office furniture, etc.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Establish safety work assessment and reward and punishment systems; 2. Establish safety assessment ledgers; 3. Organise employees to conduct safety education training and assessment; 4. Record the educational assessment of all staff; 5. Implement new employee education assessment records (three-level education); 6. Carry out education and assessment records for special workers; 7. Carry out the identification of major hazard sources, according to the engineering characteristics; 8. Carry out foreign education, practical education, back-to-work education and transfer education; 9. Organise employees to conduct emergency rescue drills.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Establish safety education and training systems; 1.2 Implement employee education assessment records; 1.3 Record the inspection and maintenance of pre-construction education; 1.4 Carry out "three violations of education"; 1.5 Organise emergency rescue drills. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Educational training theories; 2.2 Principles of emergency rescue; 2.3 Knowledge and principles of safety management; 2.4 Principles of system safety analysis; 2.5 Safety regulations. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Education and training knowledge; 3.2 Emergency rescue theories; 3.3 Common sense of safety principles;

	3.4 Types of hazards; 3.5 Common hazard sources and possible hazards and safety 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 field of algebra; 5.2 Computing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The safety education and training and safety accident emergency and rescue drills are organised by project operators, according to the specifications 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	MANAGEMENT OF CONSTRUCTION DATA	**DUTY NO.**	606
TASK TITLE	COLLECTING AND SORTING THE CONSTRUCTION DATA	**TASK NO.**	6061
PERFORMANCE CRITERIA	The person performing this task must be able to collect and organise construction data according to the standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed in the offices and on the construction sites under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Computers, printers, copiers, scanners; 2. Document cabinets, folders, punchers, shredders; 3. Notebooks, pens, phones.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Prepare the management plans of construction data; 2. Establish the ledgers of construction data; 3. Make the meeting signature forms; 4. Make the drawing joint review summaries; 5. Collect and sort the drawing review and data change; 6. Collect and sort the construction site technical disclosure data; 7. Collect and sort the construction quality inspection and acceptance data; 8. Collect and sort the quality rectification data; 9. Collect and sort the project schedule data; 10. Collect and sort the identity information, qualifications, training materials of labourers; 11. Collect and sort out project negotiation records, correspondence and contract documents; 12. Collect and sort the materials, equipment purchase, inspection and acceptance, and sampling reinspection	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Make plans of construction data collection and sorting; 1.2 Establish ledgers of construction data collection and sorting; 1.3 Track, record and collect construction data; 1.4 Investigate and collect construction data on the spot; 1.5 Request and collect construction data; 1.6 Receive, review, and register construction data; 1.7 Classify, sort and keep construction data; 1.8 Input construction data by computers. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Laws and regulations of architectural engineering; 2.2 Post standards and management regulations; 2.3 Specifications for architectural engineering data management; 2.4 Specifications for construction and management. **3.0 Theories** The person performing this task must be able to explain the following:

data; 13. Collect and sort the labour usage data for labour, materials, and machinery; 14. Collect and sort the data of the on-site certificate giving and settlement 15. Collect and sort out the data of safety training, disclosure, and hidden hazard handling; 16. Collect and sort the construction data.	3.1 Methods of data collection; 3.2 Methods of data sorting; 3.3 Methods of data storage. **4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork; 4.3 Overall planning and coordination; 4.4 Time management; 4.5 Calculating skills; 4.6 Writing competence.
DESCRIPTION OF THE END PRODUCT / SERVICE	The collection and sorting of construction data are completed according to the standards and guidelines approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Secretary and official document writing; 3. Scopes of responsibilities.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	MANAGEMENT OF CONSTRUCTION DATA	**DUTY NO.**	606
TASK TITLE	FILING AND ARCHIVING CONSTRUCTION DATA ON FILE	**TASK NO.**	6062
PERFORMANCE CRITERIA	The person performing this task must be able to set and archive construction data on file according to the standards and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed in the office under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Computers, printers, copiers, scanners; 2. Document cabinets, folders, punchers, shredders; 3. Notebooks, pens, phones.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Set and archive the drawing review and data change on file; 2. Set and archive the construction site technical disclosure data on file; 3. Set and archive the construction quality inspection and acceptance data on file; 4. Set and archive quality rectification data on file; 5. Set and archive the identity information, qualifications, training data of labourers on file; 6. Set and archive the project negotiation records, correspondence and external documents on file; 7. Set and archive the materials, equipment purchase, inspection and acceptance, and sampling reinspection data on file; 8. Set and archive the labour usage data for labour, materials, and machinery on file; 9. Set and archive the data of the on-site certificate giving and settlement on file; 10. Set and archive the data of safety	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 File the construction data; 1.2 Archive the construction data; 1.3 Input construction data by computers. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Laws and regulations of architectural engineering; 2.2 Post standards and management regulations; 2.3 Specifications for architectural engineering data management; 2.4 Specifications for construction and management. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 File composition and specification requirements; 3.2 File cover preparation methods; 3.3 File directory preparation methods; 3.4 Document arrangement numbering rules; 3.5 Filing methods; 3.6 Binding requirements for the files; 3.7 Archiving requirements for the files;

training, disclosure, and hidden hazard handling on file; 11. Filing and archiving construction materials on file.	**4.0 Essential Skills** 4.1 Communication skills; 4.2 Teamwork; 4.3 Overall planning and coordination; 4.4 Time management; 4.5 Calculating skills; 4.6 Writing competence.
DESCRIPTION OF THE END PRODUCT / SERVICE	The conducts of setting and archiving construction data on file are completed according to the standards and guidelines approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Secretary and official document writing; 3. Scopes of responsibilities.

OCCUPATION	ARCHITECTURAL ENGINEERING TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	MANAGEMENT OF CONSTRUCTION DATA	**DUTY NO.**	606
TASK TITLE	ACCEPTANCE AND HANDOVER OF CONSTRUCTION DATA	**TASK NO.**	6063
PERFORMANCE CRITERIA	The person performing this task must be able to accept and transfer the construction data according to the specifications and guidelines approved by the competent authorities.		
RANGE STATEMENT	The task can be performed in the office under the supervision of senior technicians or architectural engineers. The tools and equipment to be used include: 1. Computers, printers, copiers, scanners; 2. Document cabinets, folders, punchers, shredders; 3. Notebooks, pens, phones.		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Establish the ledgers of the inspection, acceptance and transfer of construction data; 2. Clarify the laws and regulations of the inspection, acceptance and transfer of construction data; 3. Check whether the classification of the construction data is complete; 4. Check whether the contents of the construction data are true and accurate; 5. Check whether the signing procedures of the construction data are complete; 6. Check whether the construction materials, format, writing, drawing and mounting of the construction data meet the requirements; 7. Fill in the construction data acceptance forms; 8. Transfer construction data; 9. Handle the data transfer procedures.	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Check, inspect and accept construction data; 1.2 Transfer construction data; 1.3 Handle the inspection, acceptance and transfer procedures of construction data; 1.4 Input construction data by computers. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Laws and regulations of architectural engineering; 2.2 Post standards and management regulations; 2.3 Specifications for architectural engineering data management; 2.4 Specifications for construction and management. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Provisions and methods for data inspection and acceptance; 3.2 Procedures and regulations for data transfer. **4.0 Essential Skills** 4.1 Communication skills;

	4.2 Teamwork; 4.3 Overall planning and coordination; 4.4 Time management; 4.5 Calculating skills; 4.6 Writing competence.
DESCRIPTION OF THE END PRODUCT / SERVICE	The inspection, acceptance, and transfer of construction data are completed according to the standards and guidelines approved by the competent authorities.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Secretary and official document writing; 3. Scopes of responsibilities.

TABLE 1: DACUM CHARTS FOR ARCHITECTURAL ENGINEERING TECHNICIAN - NTA 6

DUTIES	TASKS	ENABLERS
1.0 Implementation of construction organisation plans	1.1 Implementation of construction layout scheme. 1.2 Breakdown of the construction plan. 1.3 Coordinating resource approach.	**General skills and knowledge** · Cooperation with others using communication skills and submission of reports to the superiors · Knowledge of construction drawing interpretation · Skills and knowledge of surveying and lofting · Architectural construction · Construction site management · Construction organisation management **Tools and equipment** · Computers, stationery, office furniture · Specifications, standards, laws and regulations · Measuring tools **Materials** · Concrete, reinforcement, blocks · Lumber, sandstones · Cable, water pipes **Requirements for employees** · Teamwork spirit · Integrity · Time management · Emphasis on commitment · Professional ethics · Adaptability
2.0 Implementation of the construction technical scheme	2.1 Check for the errors, omissions and gaps between drawings. 2.2 Implementation of the technical disclosure of the construction work crew. 2.3 Checking the results of the laying out measurement.	**General skills and knowledge** · Cooperation with others using communication skills and submission of reports to the superiors · Organisation and management of architectural construction · Architectural construction and drawing recognition · Architectural engineering surveying

DUTIES	TASKS	ENABLERS
		· Construction processes of architectural engineering · Project management of architectural engineering · Working principles, types, structure and technical performance of construction machinery and equipment **Tools and equipment** · Computers · Stationery · Standards and industry regulations · Office furniture · Measuring instrument and tools **Materials** · Concrete · Reinforcement · Lumber, etc. **Requirements for employees** · Teamwork spirit · Integrity · Time management · Emphasis on commitment · Professional ethics · Adaptability · Respect
3.0 Inspection of construction quality and problem solving	3.1 Implementation of the pre-control and process control of the construction quality. 3.2 Implementation of process quality inspection and acceptance. 3.3 Implementation of quality improvement measures.	**General skills and knowledge** · Cooperation with others using communication skills and submission of reports to the superiors · Organisation and management of architectural construction · Architectural construction and drawing recognition · Specifications for architectural engineering · Construction processes of architectural engineering · Project management of architectural engineering · Quality control of architectural

DUTIES	TASKS	ENABLERS
		engineering · Working principles, types, structure and technical performance of construction machinery and equipment **Tools and equipment** · Computers · Stationery · Standards and industry regulations · Office furniture · Quality inspection tools **Materials** · Concrete · Reinforcement · Lumber, etc. **Requirements for employees** · Teamwork spirit · Integrity · Time management · Emphasis on commitment · Professional ethics · Adaptability · Respect
4.0 Allocation of the project resources	4.1 Preparation of the labour management plans and costs target breakdown. 4.2 Selection, inspection, acceptance and sampling reinspection of the approached materials and equipment. 4.3 Statistic of the usage of labour and consumption of materials and machinery on construction sites. 4.4 Management of the on-site certificate giving, collection and sorting of the relevant settlement information.	**General skills and knowledge** · Cooperation with others using communication skills and submission of reports to the superiors · Skills and knowledge of the cost of architectural engineering · Architectural construction and drawing recognition · Construction materials · Construction processes of architectural engineering · Project management of architectural engineering · Working principles, types, structure and technical performance of construction machinery and equipment

DUTIES	TASKS	ENABLERS
		Tools and equipment · Computers · Stationery · Standards · Industry regulations · Office furniture **Materials** · Concrete · Reinforcement · Lumber, etc. **Requirements for employees** · Teamwork spirit · Integrity · Time management · Emphasis on commitment · Professional ethics · Adaptability · Respect
5.0 Controlling project safety	5.1 Inspection of the safety conditions before starting, and the technical disclosure of the construction safety. 5.2 Identification of hazard sources and the record of work safety situations. 5.3 Handling illegal operations and safety hazards. 5.4 Carrying out safety education and training, and organising safety accident emergency and rescue drills.	**General skills and knowledge** · Cooperation with others using communication skills and submission of reports to the superiors · Safety engineering skills and knowledge · Safety regulations · Disaster prevention and alleviation · Electrician technique; · Construction processes of architectural engineering · Project management of architectural engineering · Working principles, types, structure and technical performance of construction machinery and equipment · Fire and explosion prevention **Tools and equipment** · Safety guarantee · Computers · Stationery

DUTIES	TASKS	ENABLERS
		· Office furniture · Hazard sources identification lists of architectural engineering **Materials** · Concrete · Reinforcement · Wood · Scaffold · Safety net, etc. **Requirements for employees** · Teamwork spirit · Integrity · Time management · Emphasis on commitment · Professional ethics · Adaptability · Respect
6.0 Management of construction data	6.1 Collecting and sorting the construction data. 6.2 Filing and archiving construction data on file. 6.3 Acceptance and handover of construction data.	**General skills and knowledge** · Cooperation with others using communication skills and submission of reports to the superiors · Computer skills; · Skills and knowledge of data collection, organisation, management and transfer · Official document writing **Tools and equipment** · Computers, printers, copiers, scanners · Document cabinets, folders, punchers, shredders · Stationery, office furniture **Materials** · Duplicating paper · Stationery **Requirements for employees** · Teamwork spirit · Integrity

DUTIES	TASKS	ENABLERS
		· Time management · Emphasis on commitment · Professional ethics · Adaptability · Respect