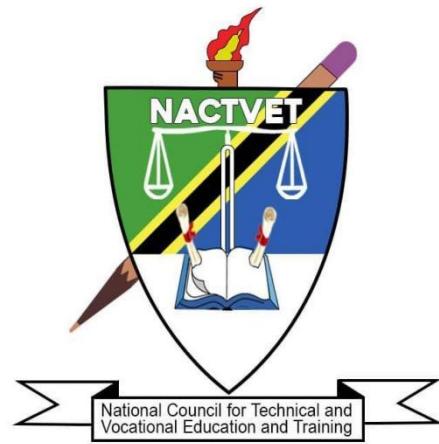


NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING



MARCH 2023

PROPOSED OCCUPATIONAL STANDARDS

**OCCUPATION: LIFTING, LOADING AND UNLOADING MACHINERY OPERATION
TECHNICIAN**

LEVEL: NTA 6

TABLE OF CONTENT

CONTENTS

ABBREVIATIONS	ii
GLOSSARY OF TERMS.....	iii
1.0. INTRODUCTION	1
2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS.....	2
3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR LIFTING, LOADING AND UNLOADING MACHINERY OPERATION TECHNICIANS	3
4.0. VALIDITY PERIOD.....	4
5.0. OCCUPATIONAL STANDARDS	4
5.1 OCCUPATIONAL STANDARDS FOR LIFTING, LOADING AND UNLOADING MACHINERY OPERATION TECHNICIAN - NTA 6.....	5
TABLE 1: DACUM CHARTS FOR LIFTING, LOADING AND UNLOADING TECHNICIAN-NTA 6...	39

ABBREVIATIONS

CBET	Competency Based Education and Training
NACTE	National Council for Technical and Vocational Education and Training
NOS	National Occupational Standards
OS	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).

Lifting, Loading and Unloading Machinery Operation 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: 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 Lifting, Loading and Unloading Machinery Operation 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 LIFTING, LOADING AND UNLOADING MACHINERY OPERATION TECHNICIANS

These standards cover a broad range of duties and tasks that can be performed by a Lifting, Loading and Unloading Machinery Operation 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 Lifting, Loading and Unloading Machinery Operation 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.

Lifting, Loading and Unloading Machinery Operation Technicians need to operate, inspect, repair and maintain the crane under the premise of ensuring the safety of personnel and cargo. Generally, the Lifting, Loading and Unloading Machinery Operation Technician performs the following responsibilities:

- a) Inspection of the working environment
- b) Daily spot inspection of equipment
- c) Basic working auxiliary operations
- d) Inspection after operations
- e) Assurance of working environment safety
- f) Equipment system inspection
- g) Basic operations
- h) Equipment inspection and adjustment
- i) Daily maintenance of equipment
- j) Elimination of the safety hazards in the working environment
- k) Equipment operation and debugging
- l) Special and economical operations
- m) Systematic inspection and adjustment
- n) Equipment periodic maintenance
- o) Judgment and exclusion of equipment faults

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 LIFTING, LOADING AND UNLOADING
MACHINERY OPERATION TECHNICIAN - NTA 6

OCCUPATION	LIFTING, LOADING AND UNLOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	ELIMINATION OF THE SAFETY HAZARDS IN THE WORKING ENVIRONMENT	DUTY NO.	601
TASK TITLE	SAFETY DETECTION OF LIFTING WORKING ENVIRONMENTS AND FACILITIES	TASK NO.	6011
PERFORMANCE CRITERIA	The person performing this task must be able to conduct hazard identification of the whole working environments to achieve safe operations under the relevant technical standards and specifications such as the identification of major danger sources of hazardous chemicals in the safety procedures of tower cranes.		
RANGE STATEMENT	<p>The task can be performed on site under the supervision of senior lifting, loading and unloading machinery operation technicians and lifting, loading and unloading engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Full set of lifting equipment toolbox; 2. Personal protective equipment, such as safety helmets, work clothes, work shoes, gloves and whistles; 3. Meteorological data receivers; 4. Level gauge; 5. Warning signs and fences; 6. Fire-fighting facilities such as fire extinguishers; 7. Signal generators. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE		
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Inspect whether the safety distance between lifting machinery and overhead circuit meets the specification requirements; 2. Inspect whether the operations area is set up a warning line and whether a person is assigned to supervise the lifting operations; 3. Inspect whether the electrical equipment of the working environment is running normally, whether there are safety hazards such as leakage, and whether there are enough safety lamps for night operations; 	<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Troubleshoot circuit safety; 1.2 Troubleshoot safety distance; 1.3 Troubleshoot auxiliary safety equipment; 1.4 Troubleshoot other potential safety hazards. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Safety judgment of the working environments and equipment of lifting; 		

<p>4. Inspect whether the safety facilities in the working environments comply with safety regulations;</p> <p>5. Inspect whether the electrical equipment in the working environments complies with safety regulations.</p>	<p>2.2 Safety specifications of working environments of lifting;</p> <p>2.3 Safety operation specifications of lifting.</p> <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Safety detection specifications of working environments of lifting;</p> <p>3.2 Loading and unloading process procedures;</p> <p>3.3 Safety protection measures of cargo loading and unloading operations.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Customer service skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Safety inspection skills.</p>
<p>DESCRIPTION OF THE END PRODUCT / SERVICE</p>	<p>The potential safety hazards in the working environments are eliminated and safety operations are conducted.</p>
<p>CIRCUMSTANTIAL KNOWLEDGE</p>	<p>Detailed knowledge about:</p> <p>1. Electronic and electrician technology;</p> <p>2. Identification of hazard sources;</p> <p>3. Knowledge of work safety and occupational health;</p> <p>4. Knowledge of fire equipment usage;</p> <p>5. Requirements of accident and hazard identification, governance and management.</p>

OCCUPATION	LIFTING, LOADING AND UNLOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	ELIMINATION OF THE SAFETY HAZARDS IN THE WORKING ENVIRONMENT	DUTY NO.	601
TASK TITLE	UNLOADING AND SIMPLE SAFETY MANAGEMENT	TASK NO.	6012
PERFORMANCE CRITERIA	The person performing this task must be able to conduct hazard identification of the whole working environments to achieve safe operations under the relevant technical standards and specifications such as the identification of major danger sources of hazardous chemicals in the safety procedures of tower cranes.		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Loading and unloading toolkits of lifting machinery; 2. Personal protective equipment, such as safety helmets, work clothes, work shoes, gloves and whistles; 3. Meteorological data receivers; 4. Level gauge; 5. Warning signs and fences; 6. Fire-fighting facilities such as fire extinguishers; 7. Signal generators. 		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Inspect the weight and gravity center of the objects before lifting. Overload lifting of heavy objects is not allowed; 2. Inspect whether the steel wire rope, fiber rope (hemp rope, brown rope, cotton rope), hooks, clamp rings, lifting ring, etc. on the crane have rust and wear; 3. Inspect whether all kinds of electric hoists, electric winches, vertical lifters (for carrying goods), manual hoists (inverted chain), jacks, etc. work safely; 4. Inspect the flatness of the working ground; 5. Set up safety warning signs and warning fences; 	<p>Detailed knowledge about:</p> <p>1.0 Methods The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Troubleshoot cargo safety; 1.2 Troubleshoot auxiliary equipment safety; 1.3 Troubleshoot other potential safety hazards. <p>2.0 Principles The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Safety judgment of the working environments and equipment of lifting; 2.2 Safety specifications of working environments of lifting; 2.3 Inspection and replacement standards of steel wire rope; 2.4 Lubrication standards for ship cargo winches; 2.5 Standard for the inspection of metal structures.

<ol style="list-style-type: none"> 6. Correctly wear personal protective equipment; 7. Clean the tools, equipment and workplaces; 8. Inspect the equipment operator's certificates and protective equipment worn; 9. Inspect the fire-fighting facilities of cranes. 	<p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> 3.1 Safety detection specifications of lifting cargo and tools; 3.2 Basic structure of ship cargo winches; 3.3 Routine spot inspection and management regulations of the equipment maintenance. <p>4.0 Essential Skills</p> <ol style="list-style-type: none"> 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Safety inspection skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	<p>The potential safety hazards in the working environments are eliminated and safety operations are conducted.</p>
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Types, characteristics, application situations and scrap standards of major tools; 2. Requirements of accident and hazard identification, governance and management; 3. Basic knowledge of ship cargo winch monitoring technology and the application of inspection equipment; 4. Occupational health and safety; 5. Common sense of fire safety.

OCCUPATION	LIFTING, LOADING AND UNLOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	ELIMINATION OF THE SAFETY HAZARDS IN THE WORKING ENVIRONMENT	DUTY NO.	601
TASK TITLE	DEVELOPMENT OF LIFTING PROCESS	TASK NO.	6014
PERFORMANCE CRITERIA	The person performing this task must be able to develop reasonable lifting processes under the safety procedures of tower cranes and other technical standards.		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Loading and unloading toolkits of lifting machinery; 2. Personal protective equipment, such as safety helmets, work clothes, work shoes, gloves and whistles; 3. Safety preliminary scheme of lifting operation; 4. Safety operations specifications of lifting; 5. Emergency supplies, such as protective devices, safety devices, warning boards and interphones; 6. Fire-fighting facilities such as fire extinguishers; 7. Periodic inspection plans of equipment. 		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Consult the literature related to lifting operations; 2. Develop lifting plans for related cargo independently; 3. Listen to the advice of the experts on the lifting plans and make reasonable modifications; 4. Interpret the modified lifting plans, and explain the rationality and safety of lifting; 5. Conduct training and interpretation for lifting related personnel, and conduct technical disclosure. 	<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Review the safety technical requirements; 1.2 Select the lifting tools; 1.3 Determine the lifting position of the lifting cargo; 1.4 Determine the lifting route. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Operating standards for lifting equipment; 2.2 Principles of preparing the lifting schemes. <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> 3.1 Loading and unloading process flows;

	<p>3.2 Safety technical operating procedures for cargo loading and unloading operations.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Customer service skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Safety inspection skills;</p> <p>4.5 Emergency disposal skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Safe, reasonable and efficient lifting schemes are developed.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Underpinning knowledge of mechanical drawing and mechanical basis; 2. Circumstantial knowledge of skill training.

OCCUPATION	LIFTING, UNLOADING AND LOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	EQUIPMENT OPERATION AND DEBUGGING	DUTY NO.	602
TASK TITLE	INSPECTION AND DEBUGGING OF TEST RUN	TASK NO.	6021
PERFORMANCE CRITERIA	The person performing this task must be able to conduct under the technical standards such as safety procedures of tower cranes, and laws and regulations such as <i>Work Safety Law</i> and <i>Special Equipment Safety Law</i> .		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Personal protective equipment, such as safety helmets, work clothes, electrician shoes and insulating gloves; 2. Instructions of lifting equipment; 3. Electrical tools and equipment, such as multimeters, electro probes, wire strippers, electrician and knives; 4. Regular inspection forms. 		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Inspect whether the oil level of the hydraulic system is normal and the pipeline is leaking; 2. Inspect whether the signal of the electrical equipment is normal; 3. Inspect whether the operations of each mechanism are normal. 	<p>Detailed knowledge about:</p> <p>1.0 Methods The person performing this task must be able to explain how to: <ol style="list-style-type: none"> 1.1 Master the management methods of daily spot inspection of equipment; 1.2 Master the scope of operations for crane overhaul. </p> <p>2.0 Principles The person performing this task must be able to explain the following principles: <ol style="list-style-type: none"> 2.1 Working principles of crane mechanical, control and hydraulic systems; 2.2 Mechanical principles and electrical principles. </p> <p>3.0 Theories The person performing this task must be able to explain the following: <ol style="list-style-type: none"> 3.1 Technical performance and use requirements of cranes; 3.2 Basic knowledge of production and organisation. </p> <p>4.0 Essential Skills 4.1 Communication skills;</p>

	<p>4.2 Customer service skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Safety inspection skills;</p> <p>4.5 Emergency disposal skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Inspection and debugging of the test run are conducted in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <p>1. Operation manuals of cranes.</p>

OCCUPATION	LIFTING, LOADING AND UNLOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	EQUIPMENT OPERATION AND DEBUGGING	DUTY NO.	602
TASK TITLE	DRAWING SIMPLE LIFTING DRAWINGS OF THE EQUIPMENT	TASK NO.	6022
PERFORMANCE CRITERIA	The person performing this task must be able to draw the specific schemes to facilitate the technical disclosure of other personnel under the technical standards such as safety procedures of tower cranes, and laws and regulations such as <i>Law of the People's Republic of China on Work Safety</i> and <i>Special Equipment Safety Law of the People's Republic of China</i> .		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Measuring toolkits; 2. Personal protective equipment, such as safety helmets, work clothes, work shoes, gloves and whistles; 3. Instructions of lifting equipment; 4. Parameter forms of lifting equipment; 5. Parameter forms of cargo. 		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Consult the literature related to lifting operations; 2. Draw lifting drawings of cargo independently; 3. Listen to the advice of the experts on the lifting drawings and make reasonable modifications; 4. Interpret the modified lifting drawings, and explain the rationality and safety of lifting; 5. Conduct training and interpretation for lifting related personnel, and conduct technical disclosure. 	<p>Detailed knowledge about:</p> <p>1.0 Methods The person performing this task must be able to explain how to: 1.1 Draw the lifting drawings of equipment.</p> <p>2.0 Principles The person performing this task must be able to explain the following principles: 2.1 The principles of mastering engineering drawings.</p> <p>3.0 Theories The person performing this task must be able to explain the following: 3.1 Basic knowledge of production and organisation.</p> <p>4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills;</p>

	<p>4.4 Safety inspection skills;</p> <p>4.5 Emergency disposal skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Simple lifting drawings are drawn in accordance with technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Knowledge of mechanical drawing; 2. Knowledge of technical training; 3. Technical requirements of cargo safe lifting.

OCCUPATION	LIFTING, LOADING AND UNLOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	SPECIAL AND ECONOMICAL OPERATIONS	DUTY NO.	603
TASK TITLE	SPECIAL ECONOMICAL OPERATIONS	TASK NO.	6031
PERFORMANCE CRITERIA	The person performing this task must be able to complete lifting tasks in special working environments, optimize lifting processes, and improve the economy of the tasks under the technical standards such as safety procedures of tower cranes, and laws and regulations such as <i>Work Safety Law</i> and <i>Special Equipment Safety Law</i> .		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Personal protective equipment, such as safety helmets, work clothes, work shoes; 2. Instructions of lifting equipment; 3. Safety operation specifications of lifting; 4. Processes of lifting, loading and unloading. 		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Cooperate with equipment maintenance, and carry the accessories of lifting equipment; 2. Operate each working mechanism reasonably to save power consumption; 3. Adopt the operations methods of energy saving and consumption reduction, according to the operating conditions, and there shall be no unbalance loading, overload, and material dropping. 	<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Develop working methods for special conditions and special environments; 1.2 Analyse and compare the dynamic property and economy of cargo winches. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Principles of process economy. <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> 3.1 Operational knowledge of the lifting equipment; 3.2 Technical requirements of process formulation. <p>4.0 Essential Skills</p> <ol style="list-style-type: none"> 4.1 Communication skills;

	<p>4.2 Customer service skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Safety inspection skills;</p> <p>4.5 Emergency disposal skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Special operations are conducted in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Circumstantial knowledge of the dynamic and economic analysis of loading and unloading machinery; 2. Knowledge of equipment energy saving and consumption reduction management; 3. Occupational health and safety; 4. Common sense of fire safety in lifting operations; 5. Basic operating methods and technical requirements of the equipment.

OCCUPATION	LIFTING, UNLOADING AND MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	SPECIAL AND ECONOMICAL OPERATIONS	DUTY NO.	603
TASK TITLE	LOADING AND UNLOADING OPERATIONS	TASK NO.	6032
PERFORMANCE CRITERIA	The person performing this task must be able to complete the operations safely and quickly during the actual lifting operations under the technical standards such as safety procedures of tower cranes, and laws and regulations such as <i>Work Safety Law</i> and <i>Special Equipment Safety Law</i> .		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Personal protective equipment, such as safety helmets, work clothes, work shoes; 2. Instructions of lifting equipment; 3. Safety operation specifications of lifting; 4. Processes of lifting loading and unloading. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE		
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Determine the gravity center of cargo with irregular shape or center gravity shift; 2. Carry out effective safety protection for dangerous, valuable and fragile items, and complete the lifting operations; 3. Take effective measures to deal with emergent incidents properly; 4. Identify command signal for lifting and moving; 5. Lift operations equipment and operate lifting tools, trolley, cart and other mechanisms, to avoid collision between the lifting tools and cargo, and to avoid the steel wire rope jumping out of the pulley groove; 6. Collaborate with various institutions for loading and unloading operations; 7. Select reasonable operations methods according to the characteristics of the cargo, and 	<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Determine the operations methods of cranes; 1.2 Complete the lifting operations; 1.3 Conduct loading and unloading operations. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Safety principles; 2.2 Equipment operating principles; 2.3 Operational planning principles; 2.4 Cargo disposal principles; 2.5 Communication and command principles. <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> 3.1 Operational knowledge of the lifting equipment; 3.2 Identification of lifting processes; 3.3 Safety operation specifications. 		

carry out loading and unloading operations independently.	<p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Customer service skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Safety inspection skills;</p> <p>4.5 Emergency disposal skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Loading and unloading operations are conducted in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Lifting and moving tools; 2. Command signals for lifting and moving; 3. Engineering mechanics.

OCCUPATION	LIFTING, UNLOADING AND LOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	SPECIAL AND ECONOMICAL OPERATIONS	DUTY NO.	603
TASK TITLE	COMPLETE THE OPERATIONS OF VARIOUS INSTITUTIONS IN COMPLEX ENVIRONMENTS	TASK NO.	6033
PERFORMANCE CRITERIA	The person performing this task must be able to complete the lifting task in complex working environments under the technical standards such as safety procedures of tower cranes, and laws and regulations such as <i>Work Safety Law</i> and <i>Special Equipment Safety Law</i> .		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Personal protective equipment, such as safety helmets, work clothes, work shoes; 2. Instructions of lifting equipment; 3. Safety operation specifications of lifting equipment. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE		
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Analyse complex environments and heavy objects and perform safe operations; 2. Operate the crane in complex environments to complete the loading and unloading and displacement of equipment and cargo; 3. Organize and guide level 4 workers to complete difficult loading and unloading operations under complex conditions. 	<p>Detailed knowledge about:</p> <p>1.0 Methods The person performing this task must be able to explain how to: <ol style="list-style-type: none"> 1.1 Determine the operations of cranes; 1.2 Detect safety of complex environments. </p> <p>2.0 Principles The person performing this task must be able to explain the following principles: <ol style="list-style-type: none"> 2.1 Safety principles; 2.2 Environmental assessment principles; 2.3 Communication and coordination principles; 2.4 Task analysis and planning principles; 2.5 Equipment adaptability principles; 2.6 Risk management principles. </p> <p>3.0 Theories The person performing this task must be able to explain the following: <ol style="list-style-type: none"> 3.1 Operational knowledge of the lifting equipment; 3.2 Identification of lifting processes; 3.3 Safety operation specifications. </p>		

	<p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Customer service skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Safety inspection skills;</p> <p>4.5 Emergency disposal skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Operations are completed in complex environments in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Engineering management knowledge; 2. Work safety knowledge; 3. Contingency handling knowledge.

OCCUPATION	LIFTING, UNLOADING AND LOADING AND MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	SPECIAL AND ECONOMICAL OPERATIONS	DUTY NO.	603
TASK TITLE	IDENTIFICATION AND ELIMINATION OF THE RISK FACTORS IN THE OPERATIONS	TASK NO.	6034
PERFORMANCE CRITERIA	The person performing this task must be able to find safety hazards in the operations process under the technical standards such as safety procedures of tower cranes, and laws and regulations such as <i>Law of the People's Republic of China on Work Safety</i> and <i>Special Equipment Safety Law of the People's Republic of China</i> .		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Personal protective equipment, such as safety helmets, work clothes, work shoes; 2. Instructions of lifting equipment; 3. Safety operation specifications of lifting equipment. 		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Dispose the emergency in the operations of the tower cranes; 2. Identify whether the operations can continue under abnormal situations. 	<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Determine the operations of cranes; 1.2 Detect safety of working environments. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Safety principles of lifting operations. <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> 3.1 Operational knowledge of the lifting equipment; 3.2 Identification of lifting processes; 3.3 Safety operation specifications. <p>4.0 Essential Skills</p> <ol style="list-style-type: none"> 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills;

	<p>4.4 Safety inspection skills;</p> <p>4.5 Emergency disposal skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Hazardous working factors are eliminated in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Basic knowledge of mechanics; 2. Knowledge of work safety and occupational health; 3. Identification of on-site warning signs.

OCCUPATION	LIFTING, UNLOADING AND LOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	SYSTEMATIC INSPECTION AND ADJUSTMENT	DUTY NO.	604
TASK TITLE	CONTROL SYSTEM PERFORMANCE INSPECTION AND ACCEPTANCE	TASK NO.	6041
PERFORMANCE CRITERIA	The person performing this task must be able to inspect, repair and accept the crane control systems under the technical standards such as safety procedures of tower cranes, and laws and regulations such as <i>Work Safety Law</i> and <i>Special Equipment Safety Law</i> .		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Personal protective equipment, such as safety helmets, work clothes, work shoes; 2. Instructions of lifting equipment; 3. Safety operation specifications of lifting equipment. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE	<p>UNDERPINNING KNOWLEDGE</p> <p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Conduct safety operations of the control systems of cranes; 1.2 Diagnose the faults of each working system. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Working principles of mechanical, electrical, control and hydraulic systems. <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> 3.1 Operational knowledge of the lifting equipment. <p>4.0 Essential Skills</p> <ol style="list-style-type: none"> 4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Safety inspection skills; 4.5 Emergency disposal skills. 		

DESCRIPTION OF THE END PRODUCT / SERVICE	Systematic inspection and adjustment are conducted in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Knowledge of mechanical manufacturing; 2. Knowledge of hydraulic transmission; 3. Knowledge of electricity and electronics.

OCCUPATION	LIFTING, UNLOADING AND LOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	SYSTEMATIC INSPECTION AND ADJUSTMENT	DUTY NO.	604
TASK TITLE	INSPECTION OF MECHANISM PERFORMANCE	TASK NO.	6042
PERFORMANCE CRITERIA	The person performing this task must be able to inspect the actuators of cranes under the technical standards such as safety procedures of tower cranes, and laws and regulations such as <i>Work Safety Law</i> and <i>Special Equipment Safety Law</i> .		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Personal protective equipment, such as safety helmets, work clothes, work shoes; 2. Instructions of lifting equipment; 3. Safety operation specifications of lifting; 4. Fastening tools. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE		
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Inspect the mechanical mechanism of cranes; 2. Find the cause of simple faults. 	<p>Detailed knowledge about:</p> <p>1.0 Methods The person performing this task must be able to explain how to: <ol style="list-style-type: none"> 1.1 Operate the actuators of cranes. </p> <p>2.0 Principles The person performing this task must be able to explain the following principles: <ol style="list-style-type: none"> 2.1 Composition and working principle of each working mechanism of cranes; 2.2 Hydraulic composition and working principle of cranes; 2.3 Working principle of crane safety protection devices. </p> <p>3.0 Theories The person performing this task must be able to explain the following: <ol style="list-style-type: none"> 3.1 Operational knowledge of the lifting equipment; 3.2 Knowledge of the mechanical mechanism of cranes. </p> <p>4.0 Essential Skills</p> <ol style="list-style-type: none"> 4.1 Communication skills; 4.2 Customer service skills; 		

	<p>4.3 Teamwork skills;</p> <p>4.4 Safety inspection skills;</p> <p>4.5 Emergency disposal skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Systematic inspection and adjustment are conducted in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Knowledge of mechanical manufacturing; 2. Knowledge of hydraulic transmission; 3. Knowledge of electricity and electronics.

OCCUPATION	LIFTING, LOADING AND UNLOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	EQUIPMENT MAINTENANCE PERIODIC	DUTY NO.	605
TASK TITLE	ORGANIZING EQUIPMENT MAINTENANCE ACCORDING TO EQUIPMENT SPOT INSPECTION PLANS	TASK NO.	6051
PERFORMANCE CRITERIA	The person performing this task must be able to conduct under the technical standards such as safety procedures of tower cranes, and laws and regulations such as <i>Work Safety Law</i> and <i>Special Equipment Safety Law</i> .		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Personal protective equipment, such as safety helmets, work clothes, work shoes; 2. Instructions of lifting equipment; 3. Maintenance facilities and tools, such as cleaning tools, oilers, lubricating oil, wrenches and screwdrivers; 4. Maintenance schedules. 		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Develop spot inspection plans and standards of lifting equipment; 2. Inspect the lifting equipment according to the spot inspection plans strictly; 3. Rectify the safety hazards found within a specified time limit; 4. Carry out key inspections on the key parts and key devices, and leave no safety hazards; 5. Carefully study the relevant contents of the inspection before conducting the inspection. 	<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Analyse the occurrence frequency of various kinds of equipment faults; 1.2 Find out the fault laws; 1.3 Maintain equipment. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Composition and working principle of each working mechanism of cranes. <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> 3.1 Operational knowledge of the lifting equipment; 3.2 The composition of crane equipment. <p>4.0 Essential Skills</p> <ol style="list-style-type: none"> 4.1 Communication skills;

	4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Safety inspection skills; 4.5 Emergency disposal skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Equipment maintenance is conducted in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: <ol style="list-style-type: none"> 1. Knowledge of crane maintenance; 2. Knowledge of mechanical fault diagnosis; 3. Knowledge of mechanical maintenance; 4. Knowledge of mechanical manufacturing; 5. Knowledge of hydraulic transmission; 6. Knowledge of electricity and electronics.

OCCUPATION	LIFTING, UNLOADING AND LOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	EQUIPMENT MAINTENANCE PERIODIC	DUTY NO.	605
TASK TITLE	IDENTIFICATION OF THE OVERALL TECHNICAL STATUS OF THE EQUIPMENT	TASK NO.	6052
PERFORMANCE CRITERIA	The person performing this task must be able to inspect and maintain the whole crane systems under the technical standards such as safety procedures of tower cranes, and laws and regulations such as <i>Work Safety Law</i> and <i>Special Equipment Safety Law</i> .		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Personal protective equipment, such as safety helmets, work clothes, work shoes; 2. Instructions of lifting equipment; 3. Maintenance facilities and tools, such as cleaning tools, oilers, lubricating oil, wrenches and screwdrivers; 4. Maintenance schedules. 		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Develop the overall inspection contents and standards of the lifting equipment; 2. Inspect the lifting equipment according to the spot inspection plans strictly; 3. Rectify the safety hazards found within a specified time limit; 4. Inspect all parts, mechanisms and systems to avoid safety hazards; 5. Carefully study the relevant contents of the inspection before conducting the inspection. 	<p>Detailed knowledge about:</p> <p>1.0 Methods The person performing this task must be able to explain how to: <ol style="list-style-type: none"> 1.1 Analyse the occurrence frequency of various kinds of equipment faults; 1.2 Find out the fault laws; 1.3 Conduct maintenance of equipment. </p> <p>2.0 Principles The person performing this task must be able to explain the following principles: <ol style="list-style-type: none"> 2.1 Composition and working principle of each working mechanism of cranes. </p> <p>3.0 Theories The person performing this task must be able to explain the following: <ol style="list-style-type: none"> 3.1 Operational knowledge of the lifting equipment; 3.2 Knowledge of mechanical fault diagnosis; 3.3 Knowledge of mechanical maintenance; 3.4 Knowledge of crane maintenance. </p>

	<p>4.0 Essential Skills</p> <p>4.1 Communication skills; 4.2 Customer service skills; 4.3 Teamwork skills; 4.4 Safety inspection skills; 4.5 Emergency disposal skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Equipment maintenance is conducted in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Knowledge of hydraulic transmission; 2. Knowledge of electricity and electronics.

OCCUPATION	LIFTING, UNLOADING AND LOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	JUDGMENT AND EXCLUSION OF EQUIPMENT FAULTS	DUTY NO.	606
TASK TITLE	DIAGNOSING THE NORMAL OPERATIONS OF EQUIPMENT ACCORDING TO THE INTUITIVE EXPERIENCE METHOD	TASK NO.	6061
PERFORMANCE CRITERIA	The person performing this task must be able to conduct under the technical standards such as safety procedures of tower cranes, and laws and regulations such as <i>Work Safety Law</i> and <i>Special Equipment Safety Law</i> .		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Personal protective equipment, such as safety helmets, work clothes, work shoes; 2. Instructions of lifting equipment; 3. Maintenance facilities and tools, such as cleaning tools, oilers, lubricating oil, wrenches and screwdrivers; 4. Maintenance schedules. 		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Analyse the working principles of the mechanical, electrical control and hydraulic pressure systems of the machine, and diagnose the faults of each working system; 2. Analyse and track the key parts of the metal structure to find cracks, welding, weary and other conditions in time; 3. Inspect whether the braking device of each mechanism is reliable; 4. Inspect the lubrication status of each lubricating part of the whole equipment. 	<p>Detailed knowledge about:</p> <p>1.0 Methods The person performing this task must be able to explain how to: <ol style="list-style-type: none"> 1.1 Visually diagnose whether the device is running properly. </p> <p>2.0 Principles The person performing this task must be able to explain the following principles: <ol style="list-style-type: none"> 2.1 Composition and working principle of each working mechanism of cranes. </p> <p>3.0 Theories The person performing this task must be able to explain the following: <ol style="list-style-type: none"> 3.1 Operational knowledge of the lifting equipment; 3.2 The structural composition and working principles of the crane equipment; 3.3 Summary of crane faults. </p> <p>4.0 Essential Skills 4.1 Communication skills;</p>

	<p>4.2 Customer service skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Safety inspection skills;</p> <p>4.5 Emergency disposal skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Faults are eliminated in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Knowledge of crane maintenance; 2. Knowledge of mechanical fault diagnosis; 3. Knowledge of mechanical maintenance; 4. Maintenance and operating policies; 5. Waste disposal methods.

OCCUPATION	LIFTING, UNLOADING AND LOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	JUDGMENT AND EXCLUSION OF EQUIPMENT FAULTS	DUTY NO.	606
TASK TITLE	ANALYSIS OF THE CAUSES OF ABNORMAL WEAR OF PARTS	TASK NO.	6062
PERFORMANCE CRITERIA	The person performing this task must be able to analyse the wear of crane related accessories, and propose improvement and optimization measures under the technical standards such as safety procedures of tower cranes, and laws and regulations such as <i>Work Safety Law</i> and <i>Special Equipment Safety Law</i> .		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Personal protective equipment, such as safety helmets, work clothes, work shoes; 2. Instructions of lifting equipment; 3. Maintenance facilities and tools, such as cleaning tools, oilers, lubricating oil, wrenches and screwdrivers; 4. Maintenance schedules. 		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Perform daily attention to the wear conditions of the crane related accessories; 2. Replace the abnormal wear parts in time; 3. Analyse the abnormal wear parts, find out the causes and make improvement measures. 	<p>Detailed knowledge about:</p> <p>1.0 Methods The person performing this task must be able to explain how to: <ol style="list-style-type: none"> 1.1 Diagnose crane fault; 1.2 Analyse part wear. </p> <p>2.0 Principles The person performing this task must be able to explain the following principles: <ol style="list-style-type: none"> 2.1 Principles of mechanical parts wear. </p> <p>3.0 Theories The person performing this task must be able to explain the following: <ol style="list-style-type: none"> 3.1 The structural composition and working principles of the crane equipment; 3.2 Summary of crane faults; 3.3 Theories of mechanical parts wear. </p> <p>4.0 Essential Skills <ol style="list-style-type: none"> 4.1 Communication skills; </p>

	<p>4.2 Customer service skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Safety inspection skills;</p> <p>4.5 Emergency disposal skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Faults are eliminated in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Safety operations of operating machines and tools; 2. Safety operations of measuring instruments; 3. Occupational health and safety; 4. Maintenance and operating policies; 5. Waste disposal methods.

OCCUPATION	LIFTING, UNLOADING AND LOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	JUDGMENT AND EXCLUSION OF EQUIPMENT FAULTS	DUTY NO.	606
TASK TITLE	COMMON FAULT DETECTION AND SIMPLE MAINTENANCE OF EQUIPMENT	TASK NO.	6063
PERFORMANCE CRITERIA	The person performing this task must be able to troubleshoot common faults of cranes and carry out simple maintenance under the technical standards such as safety procedures of tower cranes, and laws and regulations such as <i>Work Safety Law</i> and <i>Special Equipment Safety Law</i> .		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Personal protective equipment, such as safety helmets, work clothes, work shoes; 2. Instructions of lifting equipment; 3. Maintenance facilities and tools, such as cleaning tools, oilers, lubricating oil, wrenches and screwdrivers; 4. Maintenance schedules. 		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Cooperate with professional maintenance personnel to do the test run after maintenance; 2. Prepare the maintenance process of reduction gearboxes; 3. Find out the cause of the underpower and poor transmission of the equipment, and prepare maintenance plans; 4. Prepare maintenance tools, spare parts, fasteners and auxiliary materials according to maintenance process requirements. 	<p>Detailed knowledge about:</p> <p>1.0 Methods The person performing this task must be able to explain how to: <ol style="list-style-type: none"> 1.1 Diagnose crane faults; 1.2 Maintain cranes; 1.3 Develop technical requirements, standards and processes for the maintenance of typical crane parts. </p> <p>2.0 Principles The person performing this task must be able to explain the following principles: <ol style="list-style-type: none"> 2.1 Principles of mechanical parts wear; 2.2 Working principles of crane mechanical systems and electrical systems; 2.3 Principles of state detection and fault diagnosis. </p> <p>3.0 Theories The person performing this task must be able to explain the following: <ol style="list-style-type: none"> 3.1 Summary of crane faults; 3.2 Maintenance of cranes; </p>

	<p>3.3 Circumstantial knowledge of hydraulic and pneumatic transmission fault diagnosis.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Customer service skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Safety inspection skills;</p> <p>4.5 Emergency disposal skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Faults are eliminated in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Safety operations of operating machines and tools; 2. Safety operations of measuring instruments; 3. Occupational health and safety; 4. Maintenance and operating policies.

OCCUPATION	LIFTING, UNLOADING AND LOADING MACHINERY OPERATION TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	JUDGMENT AND EXCLUSION OF EQUIPMENT FAULTS	DUTY NO.	606
TASK TITLE	AVAILABILITY INSPECTION AND ACCEPTANCE OF FAULTY EQUIPMENT	TASK NO.	6064
PERFORMANCE CRITERIA	The person performing this task must be able to make a preliminary analysis of the crane fault to determine whether the equipment can continue to be used or whether the acceptance after the completion of maintenance is qualified under the technical standards such as safety procedures of tower cranes, and laws and regulations such as <i>Work Safety Law</i> and <i>Special Equipment Safety Law</i> .		
RANGE STATEMENT	<p>The task can be performed at the lifting operation sites under the supervision of senior lifting, loading and unloading machinery operation technicians. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Personal protective equipment, such as safety helmets, work clothes, work shoes; 2. Instructions of lifting equipment; 3. Maintenance facilities and tools, such as cleaning tools, oilers, lubricating oil, wrenches and screwdrivers; 4. Maintenance schedules. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE	<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Use a variety of detection equipment to detect crane faults in time; 2. Analyse and determine the faults; 3. Establish standards for the normal operations of cranes; 4. Assist in the acceptance of the crane after maintenance to see whether it meets the requirements of usage. 		
<p>UNDERPINNING KNOWLEDGE</p> <p>Detailed knowledge about:</p> <p>1.0 Methods The person performing this task must be able to explain how to:</p> <ul style="list-style-type: none"> 1.1 Diagnose crane faults; 1.2 Maintain cranes; 1.3 Use detection equipment. <p>2.0 Principles The person performing this task must be able to explain the following principles:</p> <ul style="list-style-type: none"> 2.1 Working principles of crane mechanical systems and electrical systems. <p>3.0 Theories The person performing this task must be able to explain the following:</p> <ul style="list-style-type: none"> 3.1 Fundamentals of mechanical design; 3.2 Summary of crane faults; 3.3 Maintenance of cranes. 			

	<p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Customer service skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Safety inspection skills;</p> <p>4.5 Emergency disposal skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Faults are eliminated in accordance with technical requirements and manufacturer's manuals.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Safety operations of operating machines and tools; 2. Safety operations of measuring instruments; 3. Occupational health and safety; 4. Maintenance and operating policies; 5. Waste disposal methods.

TABLE 1: DACUM CHARTS FOR LIFTING, LOADING AND UNLOADING TECHNICIAN - NTA 6

DUTIES	TASKS	ENABLERS
1.0 Elimination of the safety hazards in the working environment	<p>1.1 Safety detection of lifting working environments and facilities.</p> <p>1.2 Unloading and simple safety management.</p> <p>1.3 Safety hazard identification of the working environments.</p> <p>1.4 Preparation of the process procedures.</p>	<p>General skills and knowledge</p> <ul style="list-style-type: none"> Cooperation with others using skills and submission of reports to the superiors Usage of manufacturer's manuals Safety operation specifications of lifting equipment Safety specifications for lifting equipment Interpretation of technical drawings Safety specifications for lifting operations Work safety and loading and unloading tools and equipment General knowledge of safe lifting operations General knowledge of safe lifting operations Personal protective equipment such as helmets, work shoes, insulating shoes and insulating gloves Loading and unloading toolkits and measuring toolkits Fire-fighting facilities such as fire extinguishers Warning signs and fences <p>Materials</p> <ul style="list-style-type: none"> Safety warning stickers and other consumables in accordance with safety specifications <p>Requirements for employees</p> <ul style="list-style-type: none"> Teamwork spirit, responsibility, safety awareness and specification compliance
2.0 Equipment operation and debugging	<p>2.1 Inspection and debugging of test run.</p> <p>2.2 Drawing simple lifting drawings of the equipment.</p>	<p>General skills and knowledge</p> <ul style="list-style-type: none"> Cooperation with others using communication skills and submission of reports to the superiors Usage of manufacturer's manuals Safety operation specifications of lifting equipment Interpretation of technical drawings

DUTIES	TASKS	ENABLERS
		<ul style="list-style-type: none"> • The structure and working principles of the main mechanical mechanism • Knowledge of electrical principles of lifting equipment • Knowledge of hydraulic pressure principles of lifting equipment • Electricity and electronic knowledge <p>Tools and equipment</p> <ul style="list-style-type: none"> • Personal protective equipment such as helmets, work shoes, insulating shoes and insulating gloves • Electrical tools, loading and unloading tools and inspection tools • Fire-fighting facilities such as fire extinguishers • Warning signs and fences <p>Materials</p> <ul style="list-style-type: none"> • Equipment and tools that meet safety specifications <p>Requirements for employees</p> <ul style="list-style-type: none"> • Teamwork spirit, responsibility, safety awareness, environmental protection awareness and specification compliance
3.0 Special and economical operations	3.1 Special economical operations. 3.2 Loading and unloading operations. 3.3 Complete the operations of various institutions in complex environments. 3.4 Identification and elimination of the risk factors in the operations.	<p>General skills and knowledge</p> <ul style="list-style-type: none"> • Cooperation with others using communication skills and submission of reports to the superiors • Usage of manufacturer's manuals • Safety operation specifications of lifting equipment • Interpretation of technical drawings • Technical measures of loading and unloading safety • Processes of lifting loading and unloading • Knowledge of lifting equipment structure <p>Tools and equipment</p> <ul style="list-style-type: none"> • Personal protective equipment such as helmets, work shoes, insulating shoes and insulating gloves • Electrical tools, loading and unloading tools and inspection tools

DUTIES	TASKS	ENABLERS
		<ul style="list-style-type: none"> Fire-fighting facilities such as fire extinguishers Warning signs and fences <p>Materials</p> <ul style="list-style-type: none"> Equipment and tools that meet safety specifications <p>Requirements for employees</p> <ul style="list-style-type: none"> Teamwork spirit, responsibility, safety awareness, environmental protection awareness and specification compliance
4.0 Systematic inspection and adjustment	4.1 Control system performance inspection and acceptance. 4.2 Inspection of mechanism performance.	<p>General skills and knowledge</p> <ul style="list-style-type: none"> Cooperation with others using communication skills and submission of reports to the superiors Usage of manufacturer's manuals Safety operation specifications of lifting equipment Interpretation of technical drawings Management of lifting equipment after completing the operation Mechanical drawing and limit fitting Foundation of the lifting machinery <p>Tools and equipment</p> <ul style="list-style-type: none"> Personal protective equipment such as helmets, work shoes, insulating shoes and insulating gloves Electrical tools, loading and unloading tools and inspection tools Fire-fighting facilities such as fire extinguishers Warning signs and fences <p>Materials</p> <ul style="list-style-type: none"> Equipment, tools, emergency supplies, etc. which is in line with safety specifications <p>Requirements for employees</p> <ul style="list-style-type: none"> Teamwork spirit, responsibility, safety awareness, environmental protection awareness and specification compliance

DUTIES	TASKS	ENABLERS
5.0 Equipment periodic maintenance	<p>5.1 Organising equipment maintenance according to equipment spot inspection plans.</p> <p>5.2 Identification of the overall technical status of the equipment.</p>	<p>General skills and knowledge</p> <ul style="list-style-type: none"> Cooperation with others using communication skills and submission of reports to the superiors Usage of manufacturer's manuals Safety operation specifications of lifting equipment Interpretation of technical drawings General knowledge of the maintenance of the lifting equipment <p>Tools and equipment</p> <ul style="list-style-type: none"> Personal protective equipment such as helmets, work shoes, insulating shoes and insulating gloves Electrical tools, loading and unloading tools, inspection tools and lubricating oil Fire-fighting facilities such as fire extinguishers Warning signs and fences <p>Materials</p> <ul style="list-style-type: none"> Equipment and tools that meet safety specifications <p>Requirements for employees</p> <ul style="list-style-type: none"> Teamwork spirit, responsibility, safety awareness, environmental protection awareness and specification compliance
6.0 Judgment and exclusion of equipment faults	<p>6.1 Diagnosing the normal operations of equipment according to the intuitive experience method.</p> <p>6.2 Analysis of the causes of abnormal wear of parts.</p> <p>6.3 Common fault detection and simple maintenance of equipment.</p>	<p>General skills and knowledge</p> <ul style="list-style-type: none"> Cooperation with others using communication skills and submission of reports to the superiors Usage of manufacturer's manuals Safety operation specifications of lifting equipment Interpretation of technical drawings General knowledge of the maintenance of the lifting equipment <p>Tools and equipment</p> <ul style="list-style-type: none"> Personal protective equipment such as helmets, work shoes, insulating shoes and insulating gloves

DUTIES	TASKS	ENABLERS
		<ul style="list-style-type: none"> • Electrical tools, loading and unloading tools, inspection tools and lubricating oil • Fire-fighting facilities such as fire extinguishers • Warning signs and fences <p>Materials</p> <ul style="list-style-type: none"> • Equipment and tools that meet safety specifications <p>Requirements for employees</p> <ul style="list-style-type: none"> • Teamwork spirit, responsibility, safety awareness, environmental protection awareness and specification compliance