

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



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PROPOSED OCCUPATIONAL STANDARDS

OCCUPATION: METAL MINING TECHNICIAN

LEVEL: NTA 6

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ABBREVIATIONS

CAD	Computer-Aided Design
CBET	Competency Based Education and Training
MCN	Mining-Area Control Network
MM	Mining Method
MOPP	Maintenance Operations Processes and Procedures
MT	Mining Technology
MVSD	Mine Ventilation System Diagram
MV	Mine Ventilation
NACTVET	National Council for Technical and Vocational Education and Training
NOS	National Occupational Standards
OPSM	Open-Pit Slope Movement Monitoring
OS	Occupational Standards
SM	Surface Mining
SR	Stripping Ratio
TC	Transportation Capacity
TET	Technical Education and Training
TVET	Technical and Vocational Education and Training
UM	Underground Mining

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.
Occupational Area:	This is a broad grouping of related jobs. (Examples: coal mining technician and cartographer).
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.

Occupational Competence:

The application of knowledge and skills that consistently meet the standards required by the work context.

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., a coal mining engineer designs drift layout, ventilation system management, 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 Metal Mining Technician Occupation has its own set of occupational standards. The document explains how the occupational standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

The Occupational standards 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 Coal Mining 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 survey 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 METAL MINING TECHNICIANS

These standards cover a broad range of duties and tasks that can be performed by a Metal Mining 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 Metal Mining 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 Metal Mining Technicians shall organise and implement shaft and drift excavation, mining work, and ventilation safety management under the supervision of engineers. Technicians in metal mines complete various blasting analysis designs and organise and manage the implementation of underground mining, the implementation of surface mining, the daily management of mines and safety inspections, and the management and maintenance of mining equipment. Generally, the Metal Mining Technician performs the following responsibilities:

- a) Shaft and drift construction
- b) Organisation of shaft and drift construction
- c) Shaft and drift excavation implementation
- d) Blasting analysis, design and organisation management
- e) Surface mining construction
- f) Surface mining construction organisation
- g) Surface mining implementation
- h) Underground mining construction
- i) Underground mining construction organisation
- j) Underground mining implementation
- k) Daily management and maintenance of mine ventilation
- l) Mine ventilation management and maintenance
- m) Daily management, safety inspection and supervision of the mine
- n) Management and maintenance of mining equipment

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 METAL MINING TECHNICIAN - NTA 6

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF SHAFT AND DRIFT EXCAVATION	DUTY NO.	601
TASK TITLE	IMPLEMENTATION OF HORIZONTAL DRIFT CROSS-SECTION	TASK NO.	6011
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to design horizontal drift cross-sections and organise the implementation of construction according to different surrounding rock conditions.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the senior technicians or the chief mine engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Computer; 2. Computer-aided design software, such as AutoCAD; 3. Various types of horizontal drift construction and installation 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. Read and understand the geological information of mines; 2. Perform the selection of horizontal drift cross-sections; 3. Make a horizontal drift cross-section drawing; 4. Design supporting structures; 5. Calculate the amount of excavation work; 6. Calculate the material consumption; 7. Prepare forms of work amount and material consumption; 8. Prepare the organisation design for the construction of horizontal drift excavation. 		<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 Read and understand the geological information of mines; 1.2 Select the shape of the horizontal drift cross-section; 1.3 Calculate the size of the horizontal drift cross-section; 1.4 Design the cross-section supporting of horizontal drifts; 1.5 Organise the horizontal drift construction. <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 Specifications for the design of shaft and drift; 2.2 Principles of planimetry calculation; 2.3 Basic principles of engineering drawing; 2.4 Principles of supporting; 2.5 Principles of calculating supporting parameters. <p>3.0 Theories</p> <p>The person performing this task must be able to</p>	

	<p>explain the following:</p> <p>3.1 Principles of selecting horizontal drift cross-sections;</p> <p>3.2 Calculation of horizontal drift cross-section size;</p> <p>3.3 Theory of supporting for horizontal drift cross-sections;</p> <p>3.4 Equipment matching for the mechanised operating line of horizontal drift excavation;</p> <p>3.5 Theory of organising and managing horizontal drift construction.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Drawing skills;</p> <p>4.4 Learning skills.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	<p>The cross-section drawing of horizontal drifts is made, supporting design is carried out, forms of work amount and material consumption are prepared, and construction is organised.</p>
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Rock mechanics; 2. Material mechanics.

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF SHAFT AND DRIFT EXCAVATION	DUTY NO.	601
TASK TITLE	IMPLEMENTATION OF PATIO CROSS-SECTIONS	TASK NO.	6012
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to design patio cross-sections and organise the implementation of construction according to different surrounding rock conditions.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the senior technicians or the chief mine engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Computer; 2. Computer-aided design software, such as AutoCAD; 3. Various types of patio construction and installation 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. Read and understand the geological information of mines; 2. Perform the selection of patio cross-sections; 3. Make a patio cross-section drawing; 4. Calculate the amount of excavation work; 5. Calculate the material consumption; 6. Prepare forms of work amount and material consumption; 7. Prepare the organisation design for the construction of patio excavation. 		<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 Read and understand the geological information of mines; 1.2 Select the shape of the patio cross-section; 1.3 Calculate the size of the patio cross-section; 1.4 Select the method of patio excavation; 1.5 Organise the construction of patios. <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 Specifications for the design of shaft and drift; 2.2 Principles of planimetry calculation; 2.3 Basic principles of engineering drawing. <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 Principles of selecting patio cross-sections; 3.2 Methods of determining the cross-section size of patios; 3.3 Method of patio excavation and its advantages and disadvantages. <p>4.0 Essential Skills</p>	

	<p>4.1 Communication skills; 4.2 Teamwork skills; 4.3 Drawing skills; 4.4 Learning skills.</p> <p>5.0 Math Skills 5.1 Geometric and trigonometric function calculation skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The cross-section drawing of patios is made, forms of work amount and material consumption are prepared, and construction is organised.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Rock mechanics; 2. Material mechanics.

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF SHAFT AND DRIFT EXCAVATION	DUTY NO.	601
TASK TITLE	IMPLEMENTATION OF INCLINED SHAFT CROSS-SECTIONS	TASK NO.	6013
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to design inclined shaft cross-sections and organise the implementation of construction according to different surrounding rock conditions.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the senior technicians or the chief mine engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Computer; 2. Computer-aided design software, such as AutoCAD; 3. Various types of patio construction and installation 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. Read and understand the geological information of mines; 2. Calculate the dip angle of inclined shaft; 3. Make an inclined shaft cross-section drawing; 4. Design supporting structures; 5. Calculate the amount of excavation work; 6. Calculate the material consumption; 7. Prepare forms of work amount and material consumption; 8. Prepare the organisation design for the construction of horizontal drift excavation. 		<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 Read and understand the geological information of mines; 1.2 Calculate the dip angle of inclined shaft; 1.3 Calculate the size of the inclined shaft cross-section; 1.4 Design the cross-section supporting of inclined shafts; 1.5 Organise the construction of inclined shafts. <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 Specifications for the design of shaft and drift; 2.2 Principles of planimetry calculation; 2.3 Basic principles of engineering drawing; 2.4 Principles of supporting; 2.5 Principles of calculating supporting parameters. <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 Principles of the cross-section selection and layout of inclined shafts; 	

	<p>3.2 Methods of determining the cross-section size of inclined shafts.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Drawing skills;</p> <p>4.4 Learning skills.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The dip angle of inclined shafts is calculated, the cross-section drawing of inclined shafts is made, the supporting design is carried out, forms of work amount and material consumption are prepared, and construction is organised.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Rock mechanics; 2. Material mechanics.

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF SHAFT AND DRIFT EXCAVATION	DUTY NO.	601
TASK TITLE	IMPLEMENTATION THE CHAMBER CONSTRUCTION	TASK NO.	6014
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to design chambers and organise the implementation of construction according to the conditions of the surrounding rocks and the purpose of chambers.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the senior technicians or the chief mine engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Computer; 2. Computer-aided design software, such as AutoCAD; 3. Various types of chamber construction and installation 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. Read and understand the geological information of mines; 2. Perform chamber selection; 3. Make design drawings of chambers; 4. Design supporting structures; 5. Calculate the amount of excavation work; 6. Calculate the material consumption; 7. Prepare forms of work amount and material consumption; 8. Prepare the organisation design for chamber construction. 		<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 Read and understand the geological information of mines; 1.2 Select the type of chambers; 1.3 Calculate the size of chambers; 1.4 Select the method of chamber excavation; 1.5 Design supporting structures; 1.6 Organise the construction. <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 Specifications of chamber design; 2.2 Principles of planimetry calculation; 2.3 Basic principles of engineering drawing; 2.4 Principles of supporting; 2.5 Principles of calculating supporting parameters. <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 Principles of chamber selection; 3.2 Methods of calculating chamber size; 3.3 Theory of chamber supporting; 	

	<p>3.4 Advantages and disadvantages of chamber excavation methods.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Drawing skills;</p> <p>4.4 Learning skills.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The type of chamber is selected, design drawings of chambers are made, carry out the supporting design, supporting design is carried out, forms of work amount and material consumption are prepared, and construction is organised.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Rock mechanics; 2. Material mechanics; 3. Structural mechanics.

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF SHAFT AND DRIFT EXCAVATION	DUTY NO.	701
TASK TITLE	CONSTRUCTION ORGANISATION OF SHAFTS, DRIFTS AND CHAMBERS	TASK NO.	7015
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to organise the construction of shafts, drifts and chambers in accordance with the design.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the senior technicians or the chief mine engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Computer; 2. Computer-aided design software, such as AutoCAD; 3. Various types of chamber construction and installation 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. Read and understand design information; 2. Distribute personnel and shifts; 3. Manage the operational safety; 4. Develop a detailed plan for the construction of shafts, drifts, and chambers and design a construction cycle diagram; 5. Count up the work amount and material consumption and produce statistical reports. 		<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 Read and understand design information; 1.2 Prepare construction cycle diagrams for shafts, drifts and chambers 1.3 Count up the work amount and material consumption. <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 Basic principles of production organisation; 2.2 Principles of cost control; 2.3 Principles of preparing construction cycle diagrams. <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 The theory of construction safety management; 3.2 The process of shaft, drift and chamber construction; 3.3 Equipment matching for mechanised operating lines of shaft and drift excavation; 3.4 Methods of organising and managing shaft and drift construction. 	

	<p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Learning skills.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
<p>DESCRIPTION OF THE END PRODUCT / SERVICE</p>	<p>The design information is read and understood, personnel and shifts are distributed, safety management is conducted, construction cycle diagrams for shafts, drifts and chambers are prepared, work amount and materials consumption are counted up, and construction is organised.</p>
<p>CIRCUMSTANTIAL KNOWLEDGE</p>	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Occupational health and safety; 2. Blasting operation safety; 3. Ventilation management and safety.

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	BLASTING ANALYSIS, DESIGN AND ORGANISATION MANAGEMENT	DUTY NO.	602
TASK TITLE	BLASTING ANALYSIS	TASK NO.	6021
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to carry out blasting analysis and implement it according to the different mine conditions.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the senior technicians or the chief mine engineers. The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Computer; 2. Computer-aided design software, such as AutoCAD; 3. Drilling and blasting, and loading equipment; 4. Harmful effects monitoring equipment (blasting vibrations, etc.). 		
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. Select the drilling and blasting, and loading equipment; 2. Implement preventive and treatment measures for blasting accidents; 3. Analyse blasting effects. 		<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 Read and understand the geological information of mines; 1.2 Analyse the project (economic indicators unit consumption, blockness, etc.). <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 and basic properties of explosives; 2.2 Principles and basic properties of detonators; 2.3 Principles of explosion; 2.4 Specifications for selecting the blasting delay; 2.5 Principles of blasting equipment; 2.6 The role and scope of responsibilities of the blasting operator in blasting work; 2.7 Operation standards for the safe construction of surface mine site hole net layout, medium-deep hole and deep hole blasting. <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 Preventive and treatment measures for premature explosion and delayed explosion; 	

	<p>3.2 Preventive and treatment measures for misfire and remaining charge;</p> <p>3.3 Preventive and treatment measures for other harmful effects (blasting vibration, blasting fume poisoning, etc.);</p> <p>3.4 Properties and operation methods of the main materials (consumables and auxiliary materials) used in blasting;</p> <p>3.5 Structure, performance and testing methods of blasting equipment and how to choose the right blasting equipment;</p> <p>3.6 Properties and grading of rocks;</p> <p>3.7 Rock drilling mechanism and rock drilling machinery operation methods;</p> <p>3.8 Blasting safety techniques (storage, transportation, custody and destruction of blasting equipment; blasting safety distances, etc.);</p> <p>3.9 Determination and calculation of parameters of blasting hole net for medium-deep hole blasting and adjacent slopes in normal mining in surface mines.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills ;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Learning skills.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Blasting analysis and safe execution of blasting at mines are conducted in accordance with industry norms and requirements.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <p>1. Occupational health and safety.</p>

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	BLASTING ANALYSIS, DESIGN AND ORGANISATION MANAGEMENT	DUTY NO.	602
TASK TITLE	IMPLEMENTATION OF BLASTING DESIGN	TASK NO.	6022
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to carry out blasting design and implement it according to the different mine conditions.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the senior technicians or the chief mine engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Computer; 2. Computer-aided design software, such as AutoCAD; 3. Drilling and blasting, and loading equipment; 4. Harmful effects monitoring equipment (blasting vibrations, etc.). 		
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. Select the drilling and blasting, and loading equipment; 2. Implement preventive and treatment measures for blasting accidents; 3. Analyse blasting effects. 		<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 Select drilling and blasting equipment (model and quantity); 1.2 Select blasting equipment (model and quantity); 1.3 Select loading equipment (model and quantity). <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 and basic properties of explosives; 2.2 Principles and basic properties of detonators; 2.3 Principles of explosion; 2.4 Specifications for selecting the blasting delay; 2.5 Principles of blasting equipment; 2.6 The role and scope of responsibilities of the blasting operator in blasting work; 2.7 Operation standards for the safe construction of surface mine site hole net layout, medium-deep hole and deep hole blasting; <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 Methods for determining the type and size of 	

	<p>the chamber;</p> <p>3.2 Methods of chamber excavation;</p> <p>3.3 Properties and operation methods of the main materials (consumables and auxiliary materials) used in blasting;</p> <p>3.4 Structure, performance and testing methods of blasting equipment and how to choose the right blasting equipment;</p> <p>3.5 Properties and grading of rocks;</p> <p>3.6 Rock drilling mechanism and rock drilling machinery operation methods;</p> <p>3.7 Blasting safety techniques (storage, transportation, custody and destruction of blasting equipment; blasting safety distances, etc.);</p> <p>3.8 Determination and calculation of parameters of blasting hole net for medium-deep hole blasting and adjacent slopes in normal mining in surface mines.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Learning skills.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Blasting design and safe execution of blasting at relevant sites are carried out in accordance with industry norms and requirements.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Occupational health and safety.

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	BLASTING ANALYSIS, DESIGN AND ORGANISATION MANAGEMENT	DUTY NO.	602
TASK TITLE	ORGANISATION AND MANAGEMENT OF BLASTING WORK	TASK NO.	6023
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to organise, manage and implement blasting work according to the different mine conditions.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the senior technicians or the chief mine engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Computer; 2. Computer-aided design software, such as AutoCAD; 3. Drilling and blasting, and loading 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. Select the drilling and blasting, and loading equipment; 2. Implement preventive and treatment measures for blasting accidents; 3. Analyse blasting effects. 		<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 Implement measures to prevent premature explosion and delayed explosion and treatment; 1.2 Implement measures to prevent misfire, remaining charge and disposal; 1.3 Implement measures to prevent other harmful effects (blasting vibrations, gun smoke poisoning, etc.) and to deal with them. <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 and basic properties of explosives; 2.2 Principles and basic properties of detonators; 2.3 Principles of explosion; 2.4 Specifications for selecting the blasting delay; 2.5 Principles of blasting equipment; 2.6 The role and scope of responsibilities of the blasting operator in blasting work; 2.7 Operation standards for the safe construction of surface mine site hole net layout, medium-deep hole and deep hole blasting; <p>3.0 Theories</p>	

	<p>The person performing this task must be able to explain the following:</p> <ul style="list-style-type: none"> 3.1 Generation and hazards of premature explosion and delayed explosion; 3.2 Generation and hazards of misfire and remaining charge; 3.3 Generation and hazards of other harmful effects (blasting vibrations, blasting fume poisoning, etc.); 3.4 Structure, performance and testing methods of blasting equipment and how to choose the right blasting equipment; 3.5 Properties and grading of rocks; 3.6 Rock drilling mechanism and rock drilling machinery operation methods; 3.7 Blasting safety techniques (storage, transportation, custody and destruction of blasting equipment; blasting safety distances, etc.); 3.8 Determination and calculation of parameters of blasting hole net for medium-deep hole blasting and adjacent slopes in normal mining in surface mines. <p>4.0 Essential Skills</p> <ul style="list-style-type: none"> 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Learning skills. <p>5.0 Math Skills</p> <ul style="list-style-type: none"> 5.1 Geometric and trigonometric function calculation skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The organisation and management of blasting work and its safe execution are conducted in accordance with industry norms and requirements.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ul style="list-style-type: none"> 1. Occupational health and safety.

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF SURFACE MINING	DUTY NO.	603
TASK TITLE	IMPLEMENTATION OF DRILLING AND BLASTING	TASK NO.	6031
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to determine the technical parameters of drilling and blasting construction in accordance with the technical conditions of surface mine, and to organise or participate in the completion of drilling and blasting safety construction operations.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the chief mine engineers or senior technicians.</p> <p>The equipment and tools to be used include:</p> <ol style="list-style-type: none"> 1. Office software; 2. Computer-aided design software, such as AutoCAD; 3. Computer; 4. Drilling and blasting devices. 		
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. Read and understand mine exploration reports and geological information; 2. Understand and apply the surface mine design specification and safety technical regulations; 3. Determine the models and sets of DTH drills and roller-bit rotary rigs; 4. Determine the parameters of the blasting hole net for medium-deep hole blasting and adjacent slopes for normal mining in surface mine; 5. Prepare drawings of the drilling and blasting process; 6. Organise and participate in safe construction operations for drilling and blasting. 		<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 Read and understand the geological drawings of mines; 1.2 Combine surface mine design specifications, safety and technical regulations with production; 1.3 Prepare drawings of the drilling and blasting process; 1.4 Set up the hole net on site; 1.5 Perform medium-deep hole blasting construction for surface mines; 1.6 Perform safety management of drilling and blasting 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 Basic principles of engineering drawing; 2.2 Basic principles of safety and system optimisation; 2.3 Principle of matching equipment type, set and capacity; 2.4 Principles of loss reduction and dilution; 	

	<p>2.5 Principle of safety first and prevention crucial;</p> <p>2.6 Operation standards for the safe construction of surface mine site hole net layout, medium-deep hole and deep hole blasting;</p> <p>2.7 Working principles of the DTH drill and roller-bit rotary rig.</p> <p>3.0 Theories The person performing this task must be able to explain the following:</p> <p>3.1 Basic requirements for drilling and blasting work in surface mine;</p> <p>3.2 Selection of DTH drill and troller-bit rotary rig, and calculation method for the equipment coordination;</p> <p>3.3 Determination and calculation of parameters of blasting hole net for medium-deep hole blasting and adjacent slopes in normal mining in surface mines;</p> <p>3.4 Theory of safety and systems engineering.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Skills in reading and drawing diagrams;</p> <p>4.4 Computer skills;</p> <p>4.5 Drawing skills;</p> <p>4.6 Skills in using office software.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Deep hole drilling and blasting and drilling and blasting on adjacent slopes in normal extraction in surface mines are implemented in accordance with industry norms and requirements.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <p>1. Occupational health and safety.</p>

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF SURFACE MINING	DUTY NO.	603
TASK TITLE	IMPLEMENTATION OF ROCK LOADING AND TRANSPORTATION	TASK NO.	6032
PERFORMANCE CRITERIA	The technician performing this task in Mining Technology Department must be able to determine the loading and transportation equipment, organise or participate in the completion of the safe construction operations of loading and transportation in accordance with the objectives of the surface mine's production tasks and the mining and stripping parameters of the working surface.		
RANGE STATEMENT	The task can be performed at the construction site under the organisation and leadership of the chief mine engineers or senior technicians. The equipment and tools to be used include: 1. Office software; 2. Computer-aided design software, such as AutoCAD; 3. Computer; 4. Loading and transportation 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. Understand and apply proficiently the surface mine design specification and safety technical regulations; 2. Determine the type and set of loading and transportation equipment; 3. Determine the mode of entry and exchange of transportation equipment at the working surface; 4. Determine the main technical parameters of transportation routes; 5. Prepare drawings of the mining and stripping process; 6. Organise and participate in safe construction operations for loading and transportation. 		<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 type of loading and transportation equipment in accordance with production needs; 1.2 Determine the number of loading and transportation equipment; 1.3 Prepare drawings of the mining and stripping process; 1.4 Carry out replacement of transportation equipment at the working surface; 1.5 Perform safety management of loading and transportation equipment; 1.6 Combine surface mine design specifications, safety and technical regulations with production. <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 Basic principles of engineering drawing; 2.2 Basic principles of safety and system optimisation; 	

	<p>2.3 Principle of matching equipment type, set and capacity;</p> <p>2.4 Principles of loss reduction and dilution;</p> <p>2.5 Principle of safety first and prevention crucial.</p> <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Operation mode of loading machine shovels on the working surface;</p> <p>3.2 Extractive elements of mechanical shovel work;</p> <p>3.3 Ways to increase the productivity of excavators;</p> <p>3.4 Mode of entry and exchange of transportation equipment at the working surface;</p> <p>3.5 Technical requirements for transportation routes;</p> <p>3.6 Theory of safety and systems engineering.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Skills in reading and drawing diagrams;</p> <p>4.4 Computer skills;</p> <p>4.5 Drawing skills;</p> <p>4.6 Skills in using office software.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
<p>DESCRIPTION OF THE END PRODUCT / SERVICE</p>	<p>The safety of the extractive elements of the working face of surface mines and the associated loading and transportation work is determined in accordance with industry norms and requirements.</p>
<p>CIRCUMSTANTIAL KNOWLEDGE</p>	<p>Detailed knowledge about:</p> <p>1. Occupational health and safety.</p>

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF SURFACE MINING	DUTY NO.	603
TASK TITLE	IMPLEMENTATION OF SURFACE MINE DUMPING	TASK NO.	6033
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to complete the task of site selection and construction of dumping sites and safely discharging the waste soil and rock on a daily basis in accordance with the mine's stripping ratio, the volume of waste soil and rock, and the mining and stripping schedule.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the chief mine engineers or senior technicians.</p> <p>The equipment and tools to be used include:</p> <ol style="list-style-type: none"> 1. Office software; 2. Computer-aided design software, such as AutoCAD; 3. Computer; 4. Loading and transportation 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. Read and interpret topographical and geological drawings of the mine site and information on mining and stripping schedule; 2. Understand and apply proficiently the surface mine design specification and safety technical regulations; 3. Select the location of the dumping site; 4. Determine process and equipment of dumping; 5. Organise and participate in the safe removal of waste soil and rock; 6. Handle, control and prevent diseases in the dumping site. 	<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 Read and interpret mine topographic and geological maps, mining and stripping schedules; 1.2 Choose a soil dumping site; 1.3 Carry out safety management of soil dumping site operations; 1.4 Combine surface mine design specifications, safety and technical regulations with production. <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 Basic principles of safety and system optimisation; 2.2 Principle of matching equipment type, set and capacity; 2.3 Basic principle of selecting a soil dumping site; 2.4 Principle of safety first and prevention crucial; 2.5 Safety principle for soil dumping operations. <p>3.0 Theories</p> <p>The person performing this task must be able to</p>		

	<p>explain the following:</p> <p>3.1 Theory of safety and systems engineering;</p> <p>3.2 Basic theory of rock mechanics;</p> <p>3.3 Theory of disaster prevention and control in dumping site;</p> <p>3.4 Classification and planning method for soil dumping site;</p> <p>3.5 Soil dumping process and equipment;</p> <p>3.6 Construction and expansion of soil dumping site;</p> <p>3.7 Diseases of the soil dumping site and its control method.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Skills in reading and drawing diagrams;</p> <p>4.4 Computer skills;</p> <p>4.5 Drawing skills;</p> <p>4.6 Skills in using office software.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
<p>DESCRIPTION OF THE END PRODUCT / SERVICE</p>	<p>The site selection and construction of surface mine soil dumping sites and the safe removal of waste soil and rock operations are implemented in accordance with industry norms and requirements.</p>
<p>CIRCUMSTANTIAL KNOWLEDGE</p>	<p>Detailed knowledge about:</p> <p>1. Occupational health and safety.</p>

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF SURFACE MINING	DUTY NO.	603
TASK TITLE	PREPARATION OF MINING AND STRIPPING SCHEDULES	TASK NO.	6034
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to prepare the mining and stripping schedule rationally in accordance with the mine's production objectives, design end-of-life boundaries, working face parameters, and the availability of major production equipment, etc.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the chief mine engineers or senior technicians.</p> <p>The equipment and tools to be used include:</p> <ol style="list-style-type: none"> 1. Office software; 2. Computer-aided design software, such as AutoCAD; 3. Computer. 		
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. Read and understand surface mine boundary plans and profiles, and development system maps; 2. Understand and apply proficiently the surface mine design specification and safety technical regulations; 3. Draw layered floor maps with year-end fronts; 4. Prepare the mining and stripping schedule; 5. Draw a comprehensive year-end quarry mining floor plan for surface mines; 6. Determine the time of adopting the new production level; 7. Draw curves and graphs of the year-by-year production development. 		<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 Read and understand preliminary mine design drawings; 1.2 Combine surface mine design specifications, safety and technical regulations with production; 1.3 Draw the layered floor map of the surface mine; 1.4 Prepare the mining and stripping schedule of the surface mine; 1.5 Draw year-end maps of the surface mine; 1.6 Draw curves and graphs of the production development of the surface mine. <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 Basic principles of engineering drawing; 2.2 Basic principles of systems engineering optimisation; 2.3 Principle of balanced operational stripping ratio. <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p>	

	<p>3.1 Methods for the verification of production capacity of surface mines;</p> <p>3.2 Methods of determining and adjusting the stripping ratio for balanced production;</p> <p>3.3 Methods of preparing production mining and stripping schedules;</p> <p>3.4 Optimisation theory for systems engineering;</p> <p>3.5 Surface mine production stripping ratios and change rules.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Skills in reading and drawing diagrams;</p> <p>4.4 Computer skills;</p> <p>4.5 Drawing skills;</p> <p>4.6 Skills in using office software.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The mining and stripping schedule of the surface mine is prepared and submitted in accordance with industry norms and requirements.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <p>1. Occupational health and specification</p>

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF SURFACE MINING	DUTY NO.	603
TASK TITLE	ORGANISATION OF SURFACE MINING	TASK NO.	6035
PERFORMANCE CRITERIA	The technician performing this task in the Mining Technology Department must be able to organise the safety operation of each process, and promote the progressing of mine engineering as planned in accordance with the mining design, the production target, and the mining and stripping schedule.		
RANGE STATEMENT	The task can be performed at the construction site under the organisation and leadership of the chief mine engineers or senior technicians. The equipment and tools to be used include: 1. Office software; 2. Computer-aided design software, such as AutoCAD; 3. Computer.		
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. Read and understand the mining and stripping schedule of the surface mine; 2. Understand and apply proficiently the surface mine design specification and safety technical regulations; 3. Plan for the progressing of mine engineering; 4. Adjust the working schedule in time according to production changes; 5. Organise the safe operation of drilling, blasting, loading, transportation, and soil dumping. 		<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 Read and understand the mining and stripping schedule of the mine; 1.2 Combine surface mine design specifications, safety and technical regulations with production; 1.3 Plan for the progressing of surface mine engineering; 1.4 Organise and manage surface mining. <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 Basic principles for the progressing of surface mine engineering; 2.2 Basic principles of working step enlarging; 2.3 Basic principles of production organisation; 2.4 Principles of cost control. <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 Development procedures of the surface mine engineering; 	

	<p>3.2 Methods of working step enlarging and adjustment;</p> <p>3.3 Organisation methods for the safe production and construction of the surface mine;</p> <p>3.4 Related theory of safety management.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Skills in reading and drawing diagrams;</p> <p>4.4 Computer skills;</p> <p>4.5 Drawing skills;</p> <p>4.6 Skills in using office software.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
<p>DESCRIPTION OF THE END PRODUCT / SERVICE</p>	<p>The safety production and construction of the surface mine are conducted in accordance with industry norms and requirements.</p>
<p>CIRCUMSTANTIAL KNOWLEDGE</p>	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> Occupational health and safety.

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF UNDERGROUND MINING	DUTY NO.	604
TASK TITLE	IMPLEMENTATION OF COMMON MINING METHOD DESIGN	TASK NO.	6041
PERFORMANCE CRITERIA	The technician performing this task in the Mining Technology Department must be able to design mining methods in accordance with the technical mining conditions of different ore bodies.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the chief mine engineers or senior technicians.</p> <p>The equipment and tools to be used include:</p> <ol style="list-style-type: none"> 1. Office software; 2. Computer-aided design software, such as AutoCAD; 3. Computer. 		
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. Read and understand mine exploration reports and geological information; 2. Understand and apply the underground mine design specification and safety technical regulations; 3. Select mining methods; 4. Determine the structural parameters of blocks of the mining method; 5. Arrange the mining preparation and cutting engineering of the mining method; 6. Determine the stoping process of the mining method; 7. Draw the three-views of the mining method. 		<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 Select mining methods; 1.2 Determine the structural parameters of blocks; 1.3 Arrange mining preparation and cutting engineering; 1.4 Determine the stoping process; 1.5 Draw the three-views of the mining method. <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 The principle that the mining method shall be suitable for the technical conditions of ore body mining; 2.2 The principle that the mining method shall be safe, efficient, environmental friendly and sustainable; 2.3 Principles of minimising the cutting-mining ratio; 2.4 Principles of loss reduction and dilution; 2.5 Principles of correct, complete and clear expression of the mining three-views. <p>3.0 Theories</p> <p>The person performing this task must be able to</p>	

	<p>explain the following:</p> <p>3.1 How to count up the structural parameters of blocks for the mining method;</p> <p>3.2 How to select the mining preparation and cutting engineering for the mining method;</p> <p>3.3 The stoping theory of the mining method;</p> <p>3.4 Methods of drawing three-views for the mining method;</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Drawing skills;</p> <p>4.4 Learning skills.</p> <p>5.0 Math Skills</p> <p>The person performing this task must have the following math skills:</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Common mining methods are implemented in accordance with industry norms and requirements.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <p>1. Occupational health and safety.</p>

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF UNDERGROUND MINING	DUTY NO.	604
TASK TITLE	IMPLEMENTATION OF MINING PREPARATION AND CUTTING	TASK NO.	6042
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to carry out the corresponding mining preparation and cutting engineering according to different mining methods.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the chief mine engineers or senior technicians.</p> <p>The equipment and tools to be used include:</p> <ol style="list-style-type: none"> 1. Office software; 2. Computer-aided design software, such as AutoCAD; 3. Computer; 4. Mining preparation and cutting 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. Read and understand mine exploration reports and geological information; 2. Understand and apply the underground mine design specification and safety technical regulations; 3. Read and understand the three-views of the mining method; 4. Design the cross-section shape, size and supporting mode of the mining preparation and cutting engineering; 5. Calculate the total work amount of the mining preparation and cutting engineering for a block; 6. Calculate the cutting-mining ratio of the mining method; 7. Calculate the excavation time of the mining preparation and cutting engineering for a block; 8. Prepare the construction schedule of mining preparation and cutting engineering for a block; 9. Calculate the excavation costs of the mining preparation and cutting engineering for an ore block; 10. Organise and implement the excavation of mining preparation and cutting 		<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 Read and understand the three-views of the mining method; 1.2 Design the mining preparation and cutting engineering of the mining method; 1.3 Calculate the total costs of excavation for block mining preparation and cutting; 1.4 Calculate the total amount of work involved in mining preparation and cutting engineering; 1.5 Calculate the excavation time for mining preparation and cutting engineering; 1.6 Prepare a construction schedule for mining preparation and cutting engineering construction; 1.7 Calculate the cutting-mining ratio. <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 The principle that the mining preparation, cutting engineering, and stoping process shall be well-matched; 2.2 The principle that mining preparation and cutting engineering shall meet the requirements of stoping; 	

<p>engineering.</p>	<p>2.3 Principles of minimising the cutting-mining ratio;</p> <p>2.4 Principles of loss reduction and dilution;</p> <p>2.5 The principle that the arrangement of mining preparation, cutting engineering, and prospecting shall be well-matched.</p> <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Selection of mining schemes;</p> <p>3.2 The principle that the mining preparation, cutting engineering, and stoping process shall be well-matched.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Drawing skills;</p> <p>4.4 Learning skills.</p> <p>5.0 Math Skills</p> <p>The person performing this task must have the following math skills:</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
<p>DESCRIPTION OF THE END PRODUCT / SERVICE</p>	<p>The mining preparation and cutting engineering are implemented in accordance with industry norms and requirements.</p>
<p>CIRCUMSTANTIAL KNOWLEDGE</p>	<p>Detailed knowledge about:</p> <p>1. Occupational health and safety.</p>

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF UNDERGROUND MINING	DUTY NO.	604
TASK TITLE	IMPLEMENTATION OF STOPING	TASK NO.	6043
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to design the corresponding stoping work according to the different mining methods.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the chief mine engineers or senior technicians.</p> <p>The equipment and tools to be used include:</p> <ol style="list-style-type: none"> 1. Office software; 2. Computer-aided design software, such as AutoCAD; 3. Computer. 		
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. Read and understand mine exploration reports and geological information; 2. Understand and apply the underground mine design specification and safety technical regulations; 3. Draw the three-views of the mining method; 4. Design the methods of ore breaking, ore transportation, and goaf ground pressure management adapted to the mining method; 5. Determine the range and process of a stoping cycle; 6. Design parameters for the placement of blast holes for a stoping cycle, make the hole pattern drawing, and calculate the consumption of explosives; 7. Calculate the time required for each process of a stoping cycle; 8. Calculate the time required for a stoping cycle; 9. Calculate the amount of ores extracted in a stoping cycle; 10. Calculate the daily production capacity of a stoping room; 11. Calculate the costs of a stoping 		<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 Design rock drilling and blasting methods and ore transportation methods, and manage the ground pressure in goaf; 1.2 Calculate the amount of ore produced; 1.3 Prepare a schedule for the stoping cycle; 1.4 Calculate the daily production capacity of a stoping room; 1.5 Calculate the costs of stoping; 1.6 Make the drawing of blasting hole placement and calculate the consumption of explosives; 1.7 Determine the stoping range and process; 1.8 Calculate the time required for each stoping process. <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 "Forced Mining" and "Forced Excavation"; 2.2 Principles of using advanced rock drilling, loading, and ore removal equipment; 2.3 Principles of increasing labour productivity; 2.4 Principles of loss reduction and dilution; 2.5 Principles for keeping a safe operating environment. 	

<p>cycle;</p> <p>12. Organise and perform stoping in the stoping room.</p>	<p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Typical projects of various mining methods;</p> <p>3.2 Standards of selecting stoping processes and mining machines for various mining methods.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Drawing skills;</p> <p>4.4 Learning skills.</p> <p>5.0 Math Skills</p> <p>The person performing this task must have the following math skills:</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
<p>DESCRIPTION OF THE END PRODUCT / SERVICE</p>	<p>Stoping is implemented in accordance with industry norms and requirements.</p>
<p>CIRCUMSTANTIAL KNOWLEDGE</p>	<p>Detailed knowledge about:</p> <p>1. Occupational health and safety.</p>

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF UNDERGROUND MINING	DUTY NO.	604
TASK TITLE	IMPLEMENTATION OF ORE PILLAR STOPING AND GOAF MANAGEMENT	TASK NO.	6044
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to conduct the corresponding ore pillar stoping and goaf management in accordance with different mining methods.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the chief mine engineers or senior technicians.</p> <p>The equipment and tools to be used include:</p> <ol style="list-style-type: none"> 1. Office software; 2. Computer-aided design software, such as AutoCAD; 3. Computer. 		
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. Read and understand mine exploration reports and geological information; 2. Understand and apply the underground mine design specification and safety technical regulations; 3. Read and understand the three-views of the mining method; 4. Determine the crown pillar stoping method and design the crown pillar stoping scheme; 5. Determine the sill pillar stoping method and design the sill pillar stoping scheme; 6. Determine the rib pillar stoping method and design the rib pillar stoping scheme; 7. Determine the stoping methods of other ore pillars and design relative stoping schemes; 8. Determine the goaf treatment method and design the goaf treatment scheme; 9. Prepare the construction schedule of ore pillar stoping and goaf treatment; 10. Calculate the construction time of ore pillar stoping and goaf treatment; 11. Organise and implement ore pillar 		<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 crown pillar stoping method and design the crown pillar stoping scheme; 1.2 Determine the rib pillar stoping method and design the rib pillar stoping scheme; 1.3 Determine the sill pillar stoping method and design the sill pillar stoping scheme; 1.4 Determine the stoping methods of other ore pillars and design relative stoping schemes; 1.5 Determine the goaf treatment method and design the goaf treatment scheme; 1.6 Prepare the construction schedule of ore pillar stoping and goaf treatment; 1.7 Calculate the construction time of ore pillar stoping and goaf treatment. <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 safe and efficient ore pillar stoping and goaf treatment; 2.2 Principles of loss reduction and dilution; 2.3 Principles of rapid ore pillar stoping and goaf treatment; 2.4 Principles of using advanced rock drilling, 	

<p>stopping and goaf treatment.</p>	<p>loading, and ore removal equipment;</p> <p>2.5 Principles of increasing labour productivity.</p> <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 The open stopping method;</p> <p>3.2 The stowing method;</p> <p>3.3 Ground pressure treatment measures in the goaf.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Drawing skills;</p> <p>4.4 Learning skills.</p> <p>5.0 Math Skills</p> <p>The person performing this task must have the following math skills:</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
<p>DESCRIPTION OF THE END PRODUCT / SERVICE</p>	<p>Ore pillar stopping and goaf treatment are implemented in accordance with industry norms and requirements</p>
<p>CIRCUMSTANTIAL KNOWLEDGE</p>	<p>Detailed knowledge about:</p> <p>1. Occupational health and safety.</p>

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	IMPLEMENTATION OF UNDERGROUND MINING	DUTY NO.	604
TASK TITLE	ORGANISATION AND IMPLEMENTATION OF MINING	TASK NO.	6045
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to design the organisation and implementation of mining corresponding to the mining method.		
RANGE STATEMENT	<p>The task can be performed at the construction site under the organisation and leadership of the chief mine engineers or senior technicians.</p> <p>The equipment and tools to be used include:</p> <ol style="list-style-type: none"> 1. Office software; 2. Computer-aided design software, such as AutoCAD; 3. Computer. 		
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. Read and understand mine exploration reports and geological information; 2. Understand and apply the underground mine design specification and safety technical regulations; 3. Read and understand the three-views of the mining method; 4. Read and understand the design information and drawings of mining methods for mining preparation and cutting engineering; 5. Determine the excavation method of mining preparation and cutting engineering for the mining method; 6. Determine the type and number of equipment, type and consumption of materials, and type and number of workers needed for tunneling mining preparation and cutting engineering; 7. Organise and implement the excavation of mining preparation and cutting engineering; 8. Calculate the total work amount and excavation time of the mining preparation and cutting engineering for a block; 9. Prepare the construction schedule of mining preparation and cutting 		<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 Organise excavation, mining preparation and cutting engineering; 1.2 Carry out stoping in the stoping room; 1.3 Carry out pillar stoping and goaf treatment; 1.4 Design the organisation and implementation of mining preparation and cutting engineering; 1.5 Design the organisation and implementation of stoping in the stoping room; 1.6 Design the organisation and implementation of ore pillar stoping and goaf treatment. <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 safety, high efficiency and environmental protection in mining process; 2.2 Principles of loss reduction and dilution; 2.3 Principles of increasing labour productivity for mining; 2.4 Principles of "Forced Excavation", "Forced Mining", and "Forced Excavation"; 2.5 Principles of adopting advanced equipment and process. 	

<p>engineering for a block;</p> <ol style="list-style-type: none"> 10. Read and interpret design information and drawings for stoping operations in mining methods; 11. Determine the model and quantity of rock drilling equipment and the types and quantities of various blasting equipment in a stoping cycle; 12. Determine the type and quantity of ore handling equipment in a stoping cycle; 13. Determine the model and quantity of equipment, and the type and quantity of materials to be consumed for the goaf ground pressure management in a stoping cycle; 14. Determine the type and number of workers required for a stoping cycle; 15. Organise and perform stoping in the stoping room; 16. Calculate the time required for a stoping cycle; 17. Calculate the amount of ores extracted in a stoping cycle; 18. Read and understand the design information and drawings for ore pillar stoping and goaf treatment in the mining method; 19. Determine the type and quantity of equipment, materials to be consumed, and workers required for the stoping of crown pillars, sill pillars, rib pillars and other pillars; 20. Determine the type and quantity of equipment, materials to be consumed, and workers required for goaf treatment; 21. Organise and implement the stoping of crown pillar, sill pillar and rib pillar as well as other pillars; 22. Organise and implement goaf treatment. 	<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 Methods for determining the type and quantity of mining machines and the number of operators; 3.2 Methods for designing the blasting for mining; 3.3 Details of materials required for each process and the basis for determining consumption in the mining process. <p>4.0 Essential Skills</p> <ol style="list-style-type: none"> 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Drawing skills; 4.4 Learning skills. <p>5.0 Math Skills</p> <p>The person performing this task must have the following math skills:</p> <ol style="list-style-type: none"> 5.1 Geometric and trigonometric function calculation skills.
<p>DESCRIPTION OF THE END PRODUCT / SERVICE</p>	<p>The organisation and implementation of mining are conducted in accordance with industry norms and requirements.</p>
<p>CIRCUMSTANTIAL KNOWLEDGE</p>	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Occupational health and safety.

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	MINE VENTILATION MANNAGEMENT AND MAINTENANCE	DUTY NO.	605
TASK TITLE	MEASUREMENT OF WIND SPEED AND AIR FLOW	TASK NO.	6051
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to accurately determine the actual wind speed and air flow at the designated location.		
RANGE STATEMENT	<p>The task can be performed in mines under the supervision of senior technicians or chief engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Anemometer; 2. Stopwatch; 3. Tape measure; 4. Telemeter rod; 5. Record table; 6. Calculator. 		
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. Measure the average wind speed in shafts and drifts; 2. Measure the cross-section area of shaft and drift ventilation; 3. Calculate the correction factor for personnel obstruction; 4. Calculate the actual wind speed and ventilation volume. 		<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 Apply the lattice points method to determine the average wind speed; 1.2 Apply the parabolic method to determine the area of shaft and drift ventilation cross-sections; 1.3 Calculate the correction factor and true wind speed based on the obstruction; 1.4 Calculate the ventilation volume based on the actual wind speed and cross-section area. <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 wind speed measurement; 2.2 Principles of air quantity measurement. <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 Methods of selecting a wind gauge before 	

	<p>measurement;</p> <p>3.2 Technical and safety precautions during measurement;</p> <p>3.3 Methods for controlling errors during measurement;</p> <p>3.4 Methods of determining the average wind speed in shafts and drifts;</p> <p>3.5 Methods of determining the ventilation cross-section area of shafts and drifts;</p> <p>3.6 Methods of calculating the personnel obstruction factor.</p> <p>4.0 Essential Skills</p> <p>4.1 Report preparation skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Calculation and analysis skills;</p> <p>4.4 Error control skills.</p> <p>5.0 Math Skills</p> <p>5.1 Basic arithmetic skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The results of wind speed and air flow measurement are submitted in accordance with industry norms and requirements.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <p>1. Occupational health and safety.</p>

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	MINE VENTILATION MANNAGEMENT AND MAINTENANCE	DUTY NO.	605
TASK TITLE	AIRFLOW DISTRIBUTION IN THE MINING AREA AND WIND SUPPLY IN THE EXCAVATION FACE	TASK NO.	6052
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to conduct the airflow distribution in the mining area and the wind supply in the excavation face.		
RANGE STATEMENT	The task can be performed in mines under the supervision of senior technicians or chief engineers. The tools and equipment to be used include: 1. Calculator.		
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. Calculate the air demand of the excavation face; 2. Design the wind supply system of the excavation face; 3. Calculate the air demand and air supply in the mining area; 4. Design the control system for ventilation and airflow distribution in the mining area. 		<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 Calculate the air demand of the excavation face; 1.2 Select the method of wind supply in the excavation face; 1.3 Choose the airduct for wind supply in the excavation face; 1.4 Calculate the ventilation resistance of the airduct in the excavation face; 1.5 Choose the local fan for wind supply in the excavation face; 1.6 Estimate the investment in ventilation of the excavation face and the costs of electricity; 1.7 Calculate the actual air demand in the mining area; 1.8 Determine the reasonable air supply for the mining area; 1.9 Select the way to control the airflow distribution in the mining area; 1.10 Calculate ventilation investment and electricity fee in the mining area. <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 Mechanisms of dust and smoke extraction and 	

	<p>ventilation in excavation face;</p> <p>2.2 The balance between efficiency and economy;</p> <p>2.3 Principles of dynamic regulation and real-time monitoring.</p> <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Methods of designing ventilation systems for the excavation face;</p> <p>3.2 Advantages and disadvantages of the three methods of airflow distribution regulation in the mining area;</p> <p>3.3 Methods of designing the airflow distribution and control system for the mining area.</p> <p>4.0 Essential Skills</p> <p>4.1 Teamwork skills;</p> <p>4.2 Computing skills;</p> <p>4.3 Learning skills;</p> <p>5.0 Math Skills</p> <p>5.1 Calculation of air flow, wind resistance and power consumption.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	<p>Programs of wind supply in excavation faces and airflow distribution regulation in mining areas are proposed in accordance with industry norms and requirements.</p>
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <p>1. Occupational health and safety.</p>

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	MINE VENTILATION MANNAGEMENT AND MAINTENANCE	DUTY NO.	605
TASK TITLE	INSPECTION AND MAINTENANCE OF THE VENTILATION SYSTEM	TASK NO.	6053
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to test the operation effect of ventilation systems and the technical and economic indicators, find out problems, and put forward suggestions in accordance with the requirements.		
RANGE STATEMENT	<p>The task can be performed in mines under the supervision of senior technicians or chief mine engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Anemometer; 2. Differential pressure gauge; 3. Power meter; 4. Testers of O₂, CO₂, CO, NO₂, and SO₂ 5. Dust concentration tester; 6. Stopwatch; 7. Tape measure; 8. Telemeter rod; 9. Record table; 10. Calculator. 		
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. Design the measurement scheme of ventilation system; 2. Measure the total inlet air flow and total return air flow; 3. Measure the effective air flow of each working face; 4. Measure the actual wind speed of the working face; 5. Measure the concentration of O₂, CO₂, CO, NO₂, and SO₂ in the working face; 6. Measure the dust concentration of the working face; 7. Measure the working air flow, wind pressure and power consumption of main and auxiliary fans; 8. Calculate the qualified rate of wind speed; 		<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 Put forward the scheme of measuring points for specific uses; 1.2 Arrange various measuring points; 1.3 Measure operating parameters; 1.4 Determine the effect of dust and smoke extraction; 1.5 Calculate technical indexes; 1.6 Analyse existing problems; 1.7 Put forward suggestions for improvement. <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 Reasonable temperature and humidity; 	

<p>9. Calculate the effective air flow rate;</p> <p>10. Calculate the internal air leakage rate;</p> <p>11. Calculate the external air leakage rate;</p> <p>12. Calculate the ratio of air flow supply and demand;</p> <p>13. Calculate the operation efficiency of fan;</p> <p>14. Calculate the qualified rate of airflow quality;</p> <p>15. Calculate the comprehensive index;</p> <p>16. Calculate the power required for effective air flow per unit;</p> <p>17. Calculate the ventilation electricity consumption per unit of ore mining;</p> <p>18. Calculate the ventilation electricity fee per unit of ore mining;</p> <p>19. Calculate the annual air flow consumption of 10,000 tons of mining production;</p> <p>20. Analyse existing problems;</p> <p>21. Put forward suggestions for improvement.</p>	<p>2.3 Principles of system stability.</p> <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Selection basis of instruments before measurement;</p> <p>3.2 Preventive measures for technical problems in measurement;</p> <p>3.3 Preventive measures for safety problems in measurement;</p> <p>3.4 Methods for controlling errors in measurement;</p> <p>4.0 Essential Skills</p> <p>4.1 Report preparation skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Calculation and analysis skills;</p> <p>4.4 Error control skills.</p> <p>5.0 Math Skills</p> <p>5.1 Basic arithmetic skills.</p>
<p>DESCRIPTION OF THE END PRODUCT / SERVICE</p>	<p>Analysis reports of ventilation system operation status, and technical and economic index measurement are submitted in accordance with industry norms and requirements.</p>
<p>CIRCUMSTANTIAL KNOWLEDGE</p>	<p>Detailed knowledge about:</p> <p>1. Occupational health and safety.</p>

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	DAILY MANAGEMENT, SAFETY INSPECTION AND SUPERVISION OF THE MINE	DUTY NO.	606
TASK TITLE	PREPARATION OF VARIOUS NOTICES FOR CONSTRUCTION AND ACCEPTANCE	TASK NO.	6061
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to prepare notices for construction and acceptance in accordance with different construction projects.		
RANGE STATEMENT	<p>The task can be performed in mines under the supervision of senior technicians, chief mine engineers, or certified safety engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Computer; 2. Office software; 3. Various relevant mine construction specifications. 		
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. Prepare safety measures for special construction schemes of greater danger during the construction process, based on the engineering construction project and construction drawings of the mine project; 2. Prepare engineering construction plans of the mine projects; 3. Prepare the list of materials for the acceptance of metal mining construction; 4. Prepare construction notices; 5. Prepare specific requirements for the acceptance notice. 		<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 Inspect mine engineering construction projects; 1.2 Prepare construction schedules; 1.3 Prepare notices and engineering requirements; 1.4 Observe the specification for quality acceptance of shaft and drift engineering. <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 Quality acceptance specification for mine shaft and drift engineering; 2.2 Specifications for the mine shaft and drift engineering construction. <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 Items, contents, ranges, and requirements of notices; 3.2 Construction schedule; 3.3 Methods of preparing construction notices and acceptance notices; 3.4 Methods of preparing mine engineering construction 	

	<p>plans;</p> <p>3.5 Methods of designing safety facilities.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills ;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Office software skills;</p> <p>4.4 Learning skills.</p> <p>5.0 Math Skills</p> <p>5.1 Calculation skills in commonly-used functions.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The preparation of notifications such as notices for construction and acceptance is carried out in accordance with industry norms and requirements.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <p>1. Occupational health and safety.</p>

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	DAILY MANAGEMENT, SAFETY INSPECTION AND SUPERVISION OF THE MINE	DUTY NO.	606
TASK TITLE	PREPARATION OF MONTHLY, QUARTERLY AND ANNUALLY SAFETY PRODUCTION PLANS IN LINE WITH REALITY	TASK NO.	6062
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to prepare monthly, quarterly and annually safety production plans in line with reality in accordance with different projects.		
RANGE STATEMENT	The task can be performed in mines under the supervision of senior technicians, chief mine engineers, or certified safety engineers. The tools and equipment to be used include: 1. Computer; 2. Office software;		
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. Prepare the general objectives and requirements of work safety; 2. Prepare measures to manage work safety in production. 3. Prepare safety measures for special construction schemes of greater danger during the construction process, based on the engineering construction project and construction drawings of the mine project; 4. Prepare the monthly, quarterly and annually work safety production plans. 		<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 Read and understand the general objectives of work safety; 1.2 Read and understand the general requirements for work safety; 1.3 Develop measures to manage work safety in production. <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 work safety; 2.2 Principles of balancing economy with efficiency. <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 Measures of work safety; 3.2 Methods of preparing the general objectives of work safety; 3.3 The basis of preparing the general requirements for work safety; 3.4 Method of preparing work safety management measures. 	

	<p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Learning skills.</p> <p>5.0 Math Skills</p> <p>5.1 Calculation skills in commonly-used functions.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Monthly, quarterly and annually safety production work safety plans are submitted in accordance with industry norms and requirements.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Occupational health and safety.

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	DAILY MANAGEMENT, SAFETY INSPECTION AND SUPERVISION OF THE MINE	DUTY NO.	606
TASK TITLE	ON-SITE SAFETY INSPECTION AND SUPERVISION AND THE ISSUE OF HIDDEN HAZARD RECTIFICATION NOTICE	TASK NO.	6063
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to carry out on-site safety inspection, and hazard identification and rectification.		
RANGE STATEMENT	<p>The task can be performed under the supervision of senior technicians, chief mine engineers, or certified safety engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Computer; 2. Common software for safety inspection; 3. Office software. 		
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. Identify common accident types and dangerous and harmful factors that exist during mining construction; 2. Prepare the site checklist and the notice of hazard rectification, and inspect the site condition according to the main safety production standards of the mine; 3. Use common safety inspection methods and software to analyse hazard sources. 		<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 Be familiar with the safety standard of mining production; 1.2 Identify common dangerous and harmful factors in mining production; 1.3 Analyse relevant hazard sources. <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 work safety; 2.2 Principles of safety hazard rectification. <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 inspection methods; 3.2 Principles of hazard identification; 3.3 Measures for hazard rectification; 3.4 Hazard identification methods; 3.5 Methods of hazard assessment. 	

	<p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Computer skills;</p> <p>4.4 AutoCAD drawing skills;</p> <p>4.5 Learning skills.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Inspections are conducted to ensure the safety of construction sites and hazards are identified and rectified in accordance with industry norms and requirements.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Occupational health and safety.

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	DAILY MANAGEMENT, SAFETY INSPECTION AND SUPERVISION OF THE MINE	DUTY NO.	606
TASK TITLE	ACCEPTANCE AND STATISTICS OF VARIOUS MINING ENGINEERING, CONCEALED ENGINEERING AND AUXILIARY ENGINEERING	TASK NO.	6064
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to carry out the acceptance and statistics of mining engineering, concealed engineering, auxiliary engineering, etc.		
RANGE STATEMENT	<p>The task can be performed in mines under the supervision of senior technicians or chief mine engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Computer; 2. Office software; 3. Various relevant mine construction specifications. 		
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 concealed and auxiliary engineering based on construction items and construction drawings of the mine projects; 2. Prepare the list of acceptance materials for mining construction and the list of concealed engineering; 3. Complete acceptance in accordance with the construction operation specifications and acceptance process. 		<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 Prepare the construction acceptance list; 1.2 Prepare the acceptance list of concealed construction; 1.3 Organise construction acceptance. <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 Engineering quality principles; 2.3 Engineering compliance principles; 2.4 Quality acceptance specification for mine shaft and drift engineering; 2.5 Specifications for the mine shaft and drift engineering construction. <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 Preparation of the principles for quality acceptance of mine shaft and drift engineering; 	

	<p>3.2 Statistical methods of concealed engineering; 3.3 Project quality acceptance records of concealed engineering.</p> <p>4.0 Essential Skills 4.1 Communication skills; 4.2 Teamwork skills; 4.3 Management skills; 4.4 Learning skills.</p> <p>5.0 Math Skills 5.1 Calculation skills in ordinary functions.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The acceptance of mining engineering, concealed engineering, and auxiliary engineering is completed according to industry norms and requirements.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> Occupational health and safety.

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	DAILY MANAGEMENT, SAFETY INSPECTION AND SUPERVISION OF THE MINE	DUTY NO.	606
TASK TITLE	ADJUSTMENT OF TECHNICAL SCHEMES AND CORRECTION OF CONSTRUCTION PARAMETERS ACCORDING TO CHANGES IN FIELD CONDITIONS	TASK NO.	6065
PERFORMANCE CRITERIA	The person performing this task in the Mining Technology Department must be able to complete the correction of relevant parameters and adjust technical schemes according to the change of field conditions.		
RANGE STATEMENT	<p>The task can be performed in mines under the supervision of senior technicians or chief mine engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Computer; 2. Computer-aided design software, such as AutoCAD; 3. Various on-site construction 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. Optimize and adjust the construction technical scheme according to the construction schedule; 2. Correct construction parameters based on mine geology, design and other data; 3. Prepare safety measures for special construction schemes of greater danger during construction. 		<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 Prepare security technical schemes; 1.2 Correct construction parameters; 1.3 Adjust the construction technical schemes. <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 Principles of balancing efficiency and 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 Requirements for correcting construction parameters; 3.2 Mine construction technology and methods; 3.3 Preparation methods of construction technical schemes; 3.4 Preparation methods for special construction 	

	<p>schemes of greater danger;</p> <p>3.5 The specific process of changing the construction scheme.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Computer skills;</p> <p>4.4 AutoCAD drawing skills;</p> <p>4.5 Learning skills.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The changed technical schemes are submitted in accordance with industry norms and requirements.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <p>1. Occupational health and safety.</p>

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	MANAGEMENT AND MAINTENANCE OF MINING EQUIPMENT	DUTY NO.	607
TASK TITLE	MANAGEMENT OF MINING EQUIPMENT	TASK NO.	6071
PERFORMANCE CRITERIA	The person performing this task must implement the selection of equipment rationally in accordance with the principles of metal mining equipment selection.		
RANGE STATEMENT	<p>The task can be performed in metal mines under the supervision of senior technicians or electrical and mechanical engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Industry-related specifications; 2. Computer; 3. Calculator; 4. CAD software; 5. Printer. 		
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. Comply with relevant safety regulations and industry norms; 2. Prepare for the reference books and tools necessary for selection and design; 3. Collect raw data on metal mining equipment selection and design; 4. Correctly select and calibrate the models, specifications and quantities of transportation equipment for metal mines in accordance with the production conditions and relevant procedures and specifications; 5. Prepare protocols for the use management. 		<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 Implement industry-related safety specifications; 1.2 Determine the applicable place for metal mining equipment; 1.3 Select device model. <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 equipment; 2.2 Principles for equipment selection. <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 Components of the equipment and the role of each part; 3.2 Calculation methods and steps for equipment selection. <p>4.0 Essential Skills</p>	

	<p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Equipment operation and selection skills;</p> <p>4.4 Learning skills.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The person performing this task must be able to correctly select and calibrate the models, specifications and quantities of mine transportation equipment and prepare the design instructions in accordance with the production conditions and relevant procedures and specifications.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Safety procedures; 2. Quality standardization; 3. Laws and regulations of work safety; 4. Occupational health and safety.

OCCUPATION	METAL MINING TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	MANAGEMENT AND MAINTENANCE OF MINING EQUIPMENT	DUTY NO.	607
TASK TITLE	MAINTENANCE OF MINING EQUIPMENT	TASK NO.	6072
PERFORMANCE CRITERIA	The person performing this task must be able to repair and maintain equipment in accordance with the technical requirements for repair and maintenance of equipment.		
RANGE STATEMENT	<p>The task can be performed in repair workshops under the supervision of senior technicians or electrical and mechanical engineers.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Metal mining equipment; 2. Crane; 3. Equipment maintenance tool kit; 4. Personal protective equipment; 5. Lathe, milling machine, electric welding machine, etc.; 6. Mechanical fitter's tool. 		
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. Comply with the content related to major, intermediate, and minor repairs of coal mine transportation equipment, as well as the maintenance requirements when performing tasks; 2. Analyse faults of transportation equipment and their causes; 3. Develop a maintenance scheme; 4. Prepare for tools for maintenance; 5. Repair the faulty part; 6. Maintain the equipment; 7. Debug the equipment. 		<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 Apply the content related to major, intermediate, and minor repairs of coal mine transportation equipment, as well as the maintenance requirements; 1.2 Troubleshoot common faults with major equipment components; 1.3 Repair the main components of the 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 Equipment maintenance and overhaul system; 2.2 Equipment maintenance system. <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 Common faults of major components of transportation equipment and their causes; 3.2 Processes and methods for repairing major 	

	<p>components of transportation equipment.</p> <p>4.0 Essential Skills</p> <p>4.1 Communication skills;</p> <p>4.2 Teamwork skills;</p> <p>4.3 Learning skills.</p> <p>5.0 Math Skills</p> <p>5.1 Geometric and trigonometric function calculation skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The repair of the fault and the maintenance and debugging of the equipment are completed, and the relevant requirements of the industry are met after maintenance in accordance with industry norms and requirements.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Safety procedures; 2. Quality standardization; 3. Laws and regulations of work safety; 4. Occupational health and safety.

TABLE 1: DACUM CHARTS FOR METAL MINING TECHNICIAN - NTA 6

DUTIES	TASKS	ENABLERS
<p>1.0 Shaft and drift excavation implementation</p>	<p>1.1 Implementation of horizontal drift cross-section.</p>	<p>General skills and knowledge</p> <ul style="list-style-type: none"> • Knowledge of mining geological data reading • Selection and size calculation • Supporting design and calculation • Basic knowledge of engineering drawing • Basic knowledge of mathematics • Interpretation of design data and drawings • Statistics of engineering quantity and material consumption • Communication skills • Teamwork skills • Engineering drawing skills • Learning skills <p>Tools and equipment</p> <ul style="list-style-type: none"> • Computers • Construction tools <p>Materials</p> <ul style="list-style-type: none"> • Timbering materials <p>Requirements for employees</p> <ul style="list-style-type: none"> • Safety consciousness
	<p>1.2 Implementation of patio cross-sections.</p>	
	<p>1.3 Implementation of inclined shaft cross-section.</p>	
	<p>1.4 Implementation the chamber construction.</p>	
	<p>1.5 Construction organisation of shafts, drifts and chambers.</p>	
<p>2.0 Blasting analysis, design and organisation management</p>	<p>2.1 Blasting analysis.</p>	<p>General skills and knowledge</p> <ul style="list-style-type: none"> • Basic knowledge of engineering drawing • Basic knowledge of mathematics • Communication skills • Teamwork skills • Engineering drawing operation skills • Learning skills <p>Tools and equipment</p> <ul style="list-style-type: none"> • Computers • Blasting equipment and tools • Safety marks and warning signs <p>Materials</p> <ul style="list-style-type: none"> • Sheets
	<p>2.2 Implementation of blasting design.</p>	
	<p>2.3 Organisation and management of blasting work.</p>	

DUTIES	TASKS	ENABLERS
		Requirements for employees <ul style="list-style-type: none"> • Safety consciousness
3.0 Implementation of surface mining	3.1 Implementation of drilling and blasting. 3.2 Implementation of rock loading and transportation. 3.3 Implementation of surface mine dumping. 3.4 Preparation of mining and stripping schedules. 3.5 Organisation of surface mining.	General skills and knowledge <ul style="list-style-type: none"> • Engineering drawing and basic knowledge of drawing reading • Basic knowledge of mathematics • Safety operation knowledge of mechanical equipment and blasting equipment • Communication skills • Teamwork skills • Engineering drawing operation skills • Learning skills Tools and equipment <ul style="list-style-type: none"> • Computers • Safety marks and warning signs • Mechanical equipment • Blasting equipment Materials <ul style="list-style-type: none"> • Sheets Requirements for employees <ul style="list-style-type: none"> • Safety consciousness • Professional dedication
4.0 Implementation of underground mining	4.1 Implementation of common mining method design. 4.2 Implementation of mining preparation and cutting. 4.3 Implementation of stoping. 4.4 Implementation of ore pillar stoping and goaf management. 4.5 Organisation and implementation of mining.	General skills and knowledge <ul style="list-style-type: none"> • Use of AutoCAD and Office software. • Basic knowledge of engineering drawing • Basic knowledge of mathematics • Communication skills • Teamwork skills • Engineering drawing operation skills • Learning skills Tools and equipment <ul style="list-style-type: none"> • Computers • Mechanical equipment • Blasting devices

DUTIES	TASKS	ENABLERS
		<p>Materials</p> <ul style="list-style-type: none"> • Sheets • Timbering materials <p>Requirements for employees</p> <ul style="list-style-type: none"> • Safety consciousness • Professional dedication
5.0 Mine ventilation management and maintenance	5.1 Measurement of wind speed and air flow.	<p>General skills and knowledge</p> <ul style="list-style-type: none"> • Drawing and basic knowledge of drawing reading • Basic knowledge of mathematics • Operation skills for anemometers, stopwatches, tape measures and telemeter rod • Teamwork skills • Calculation and analysis skills • Learning skills <p>Tools and equipment</p> <ul style="list-style-type: none"> • Computers • Anemometers • Stopwatches • Tape measures • Telemeter rods • Record charts • Differential pressure gauges • Power meters • Air composition testers • Dust concentration testers • Calculators • Drill bits and boring equipment • Engineering equipment and machinery • Safety equipment and protective equipment • Ventilation equipment and ducts • Eco-friendly equipment (sewage treatment, waste disposal, etc.) <p>Materials</p> <ul style="list-style-type: none"> • Blasting materials (explosives, detonating devices, etc.) • Construction materials (concrete, steel, etc.)
	5.2 Airflow distribution in the mining area and wind supply in the excavation face.	
	5.3 Inspection and maintenance of the ventilation system.	

DUTIES	TASKS	ENABLERS
		<p>Requirements for employees</p> <ul style="list-style-type: none"> • Safety consciousness
<p>6.0 Daily management, safety inspection and supervision of the mine</p>	<p>6.1 Preparation of various notices for construction and acceptance.</p> <p>6.2 Preparation of monthly, quarterly and annually safety production plans in line with reality.</p> <p>6.3 On-site safety inspection and supervision and the issue of hidden hazard rectification notice.</p> <p>6.4 Acceptance and statistics of various mining engineering, concealed engineering and auxiliary engineering.</p> <p>6.5 Adjustment of technical schemes and correction of construction parameters according to changes in field conditions.</p>	<p>General skills and knowledge</p> <ul style="list-style-type: none"> • Basic knowledge of engineering drawing • Knowledge of design techniques • Basic knowledge of safety hazard identification • Knowledge of major hazards • Safety management knowledge • Basic knowledge of mining engineering • Knowledge of concealed engineering • Knowledge of acceptance engineering • Basic knowledge of construction engineering • Knowledge of construction management <p>Tools and equipment</p> <ul style="list-style-type: none"> • Computers • Mapping software • Safety equipment and appliances • Safety signs and marks <p>Materials</p> <ul style="list-style-type: none"> • Sheets <p>Requirements for employees</p> <ul style="list-style-type: none"> • Hard-working • Solidarity and cooperation • Honesty and responsibility • Down-to-earth and dedicated
<p>7.0 Management and maintenance of mining equipment</p>	<p>7.1. Management of mining equipment.</p> <p>7.2. Maintenance of mining equipment.</p>	<p>General skills and knowledge</p> <ul style="list-style-type: none"> • Communication skills • Technical drawing interpretation • Equipment management and statistics <p>Tools and equipment</p> <ul style="list-style-type: none"> • Computers

DUTIES	TASKS	ENABLERS
		<ul style="list-style-type: none"> • Mapping software • Safety equipment and appliances • Safety signs and marks <p>Materials</p> <ul style="list-style-type: none"> • Sheets <p>Requirements for employees</p> <ul style="list-style-type: none"> • Hard-working • Solidarity and cooperation • Honesty and responsibility