



**National Competency Standards
For
“Level-4 Mining Process Technology”**



**National Vocational and Technical Training Commission (NAVTTC),
Government of Pakistan**



ACKNOWLEDGEMENT

National Vocational and Technical Training Commission (NAVTTTC) extends its gratitude and appreciation to representatives of business, industry, academia, government agencies, provincial TEVTAs, sector skill councils and trade associations who spared time and extended their expertise for the development of National Vocational Qualifications for the trade of **Mining Process Technology**. This work would not have been possible without the technical support of the above personnel.

NAVTTTC initiated development of CBT&A based qualifications for 200 traditional / hi-tech trades under the Prime **Minister’s Hunarmand Pakistan Program**, focusing on Development & Standardization of 200 Technical & Vocational Education & Training (TVET) Qualifications. NAVTTTC efforts have received full support from the Ministry of Federal Education and Professional Training, which highly facilitated progress under this initiative.

It may not be out of place to mention here that all the experts of Industry, Academia, VET TEVTAs, BTEs and PVTC work diligently for making this qualification worthy and error free for which all credit goes to them. However, NAVTTTC accepts the responsibility of all the errors and omissions still prevailing in the qualification document.

Development of Skill Standards is a dynamic and ongoing process, and the developed skill standards need periodic review and updating owing to the constant technological advancements, development in scientific knowledge, and growing experience of implementation at the grass root level as well as the demand of industry. NAVTTTC will ensure to keep the qualifications abreast with the changing demands of both national and international job markets.

**Executive Director,
NAVTTTC**



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1. Introduction

Mining technology is extraction of valuable minerals ores like Manganese, tantalum, Cassiterite, copper, tin, nickel, bauxite, iron, gold, silver, and diamonds or other geological materials from the surface or under the earth. Usually these ore bodies in the form of lode, vein, seam, reef, or placer deposit. In other words, industrial activity removes rock from the Earth's crust and processes it to remove valuable minerals for us to use. This technology in a wider sense also includes extraction of any non-renewable resource such as petroleum, natural gas, or even water.

Primarily, there are two types of mining methods being used for the extraction of minerals and ores; surface/opencast mining and underground mining. The choice of method is largely determined by factors such as depth, geology of the mineral deposit and the cost of equipment. When evaluating mineral deposits, it is extremely important to keep profit in mind. The total quantity of mineral in a given deposit is referred to as the mineral inventory, but only that quantity that can be mined at a profit is termed ore reserves.

The overall sequence of activities in modern mining is often compared with the five stages in the life of a mine: prospecting, exploration, development, exploitation, and reclamation. In the first Prospecting stage; geophysical, geochemical procedures, Location of favourable loci (maps, literature, and old mines), Air source/aerial photography, airborne geophysics, satellite, Surface/ground geophysics, geology and Spot anomaly is evaluated. Exploration (Ore body); Sample (drilling or excavation), assay, testing analysis, Estimation tonnage and grade, Value deposit: present value, income cost, Feasibility study: make decision to abandon or develop. Development (Prospect); Acquire mining rights (purchase or lease), File environmental impact statement, technology, assessment, permit, Construct access roads, transport system, Locate surface plant, construct facilities, Excavate deposit (strip or sink shaft). Exploitation (Mine); Factors in choice of methods like geologic, geographic, economic, environmental, societal safety, Types of mining methods. Surface: open pit, open cast, etc. Underground: room and pillar, block caving, etc. Monitor costs and economic payback. Reclamation (Real estate); Removal of plant and buildings. Reclamation of waste and tailings dumps, Monitoring of discharges

Being cognizant of this fact, National Vocational & Technical Training Commission (NAVTTTC) developed competency standards for Mining and mineral technology training under National Vocational Qualifications Framework (NVQF). These competency standards have been developed by a Qualifications Development Committee (QDC) and validated by the Qualifications Validation Committee (QVC) having representation from the leading development in mining area of the country.



2. Purpose of the Qualification

The competency based NVQ has been developed to train the unskilled men and women of Pakistan on the technical and entrepreneurial skills to be employed / self-employed and inevitably set sustainable impact on their lives by enhancing their livelihood income.

The purpose of these qualifications is to set professional standards for upcoming experts, who will serve as key elements enhancing quality of Pakistan’s manufacturing sector. The specific objectives of developing these qualifications are as under:

- Improve the professional competencies of individual in metallurgy and cast metal technology
- Capacitate the local community and trainers in modern CBT trainings, methodologies and processes as envisaged under NVQF
- Provide flexible pathways and progressions in metallurgy and cast metal technology
- Enable the trainees to perform their duties in efficient manner
- Establish a standardized and sustainable system of training in Pakistan
- Enabling the youth with greater employment opportunities



3. Date of Validation

The level 4 Mining Process Technology qualification has been validated on 04 Oct to 08 Oct, 2021 at PITAC, Lahore, by the qualification validation committee (QVC) members.

4. Date of Review

The qualification shall be reviewed after 3 years.

5. Codes of Qualifications

| Qualification Title | Code |
|--|----------------|
| National Vocational Certificate Level 4 in Mining Process Technology “ Assistant Supervisor ” | 724MP14 |



6. Members of Qualification Development Committee

The following members participated in the qualification development process at PITAC, Lahore.

Date: 13 to 17 August 2021

| S# | Name | Designation |
|-----|--------------------------|--|
| 1. | Dr. Shahid Tufail Sheikh | Member Science, Ex-Head of MPRC Lahore |
| 2. | Dr. Farhat Yasmeen | Professor, UET Lahore |
| 3. | Dr. Muhammad Naeem Khan | AP, Govt Science College Wahdat Road, Lahore |
| 4. | Dr. Irfan Hafeez | Senior Scientific Officer, PCSIR Lahore |
| 5. | Dr. Asma Sheikh | Scientific Officer, PCSIR Lahore |
| 6. | Dr. Shafia Iftikhar | AP, University of Sahiwal |
| 7. | Muhammad Irfan Zubair | Deputy Director GSP, Lahore |
| 8. | Shahbaz Muhammad | Assistant geophysicist GSP, Lahore |
| 9. | Hafiz Zeeshan Akram | Assistant Director GSP, Lahore |
| 10. | Muhammad Shahzad | Director, NAVTTC, Islamabad |
| 11. | Engr. Saba Sadiq | DACUM FACILITATOR, Islamabad |



7. Members of Qualification Development Committee

The following members participated in the qualification development process at PITAC, Lahore. **Date: Oct 4th 2021 to oct 8th 2021**

| S# | Name | Designation |
|------------|------------------------------|--|
| 1. | Aftab Hussain | DACUM Facilitator/ Principal P-TEVTA Rawalpindi |
| 2. | Dr. Shahid Tufail Sheikh | Member Science, Ex-Head of MPRC Lahore |
| 3. | Dr. Farhat Yasmeen | Professor, UET Lahore |
| 4. | Dr. Muhammad Naeem Khan | AP, Govt Science College Wahdat Road, Lahore |
| 5. | Dr. Irfan Hafeez | Senior Scientific Officer, PCSIR Lahore |
| 6. | Engr. Shafaat Ali | Lecturer (Mining) GCT KharBajaur |
| 7. | Engr. M. MuneeburRehman Khan | Measurement Engineer, ACC PVT Ltd |
| 8. | ZeeshanMusadiq | Data Engineer/Mudlogger (Geologist) Petro Services |
| 9. | Tariq Mehmoob | Incharge Operational Wing PBTE, Lahore |
| 10. | Mr. Tahir Shah | Assistant Secretary TTB Peshawar |
| 11. | Syed Mansoor Ahmed | Assistant Manager IT, NVQF Registry Incharge, SBTE Sindh |

8. ENTRY REQUIREMENTS

For National Vocational Certificate Level-4 in Mining process Technology “Assistant Supervisor”, the entry requirement is Level-3 in Mining process Technology “Senior Technician” in formal institute. The entry in informal sector is not prescribed.

9. Regulation of the Qualification and schedule of units

Not applicable



National Competency Standards for “Assistant Supervisor in Mining Process Technology”



10. Summary of Competency Standards

| Sr. No | Competency Standards | NVQ F Level | Category | Estimated Contact Hr. | | | Credit Hr. |
|--|--|-------------|-----------|-----------------------|-----|-------|------------|
| | | | | Th. | Pr. | Total | |
| Assistant supervisor in Mining Process Technology -LEVEL 4 | | | | | | | |
| 1. | Analyze with Workplace Policy and Procedures | 4 | Generic | 12 | 18 | 30 | 3 |
| 2. | Perform Advance communication | 4 | Generic | 20 | 30 | 50 | 5 |
| 3. | Establish and Maintain the Occupational Health and Safety System | 4 | Generic | 20 | 30 | 50 | 5 |
| 4. | Maintain Professionalism in Workplace | 4 | Generic | 14 | 66 | 80 | 8 |
| 5. | Operate Machines for Mining | 4 | Technical | 31 | 99 | 130 | 13 |
| 6. | Perform Underground Mining Technique | 4 | Technical | 26 | 114 | 140 | 14 |
| 7. | Perform Surface Mining Technique | 4 | Technical | 26 | 114 | 140 | 14 |
| 8. | Install Ground Support | 4 | Technical | 24 | 126 | 150 | 15 |
| 9. | Operate Underground Mining Machines | 4 | Technical | 29 | 171 | 200 | 20 |
| 10. | Carryout Dredging Operations | 4 | Technical | 29 | 171 | 200 | 20 |
| 11. | Perform Basic Green Skills for Mining | 4 | Generic | 9 | 21 | 30 | 3 |
| Total | | | | 240 | 960 | 1200 | 120 |



11. Details of Competency Standards

Level 4 – Assistant Supervisor in Mining Process

041700841A-Competency Standard: Analyze with Workplace Policy and Procedures

Overview: This unit describes the skills and knowledge required to implement a workplace policy & procedures and to modify the policy to suit changed circumstances. It applies to individuals with managerial responsibilities who undertake work developing approaches to create, monitor and improve strategies and policies within workplaces and engage with a range of relevant stakeholders and specialists.

| Competency Unit | Performance Criteria |
|--|--|
| CU1. Manage work timeframes | <p>You must be able to:</p> <p>P1. Complete work tasks within deadlines in according to order of priority</p> <p>P2. Supervisors are informed of any delays in work times or projects</p> |
| CU2. Manage to convene meeting | <p>You must be able to:</p> <p>P1. Develop agenda in line with meeting purpose</p> <p>P2. Select participants and notify them accordingly</p> <p>P3. Carryout meeting arrangements according to the time</p> <p>P4. Record the minutes of the meeting</p> |
| CU3. Set and meet own work priorities at instant | <p>You must be able to:</p> <p>P1. Take initiative to prioritize and facilitate competing demands to achieve organizational goals and objectives</p> <p>P2. Use technology efficiently and effectively to manage work priorities and commitments</p> <p>P3. Maintain appropriate work-life balance</p> |
| CU4. Develop and maintain professional competence | <p>You must be able to:</p> <p>P1. Assess personal knowledge and skills against competency</p> <p>P2. Participate in networks to enhance personal knowledge, skills and work relationships</p> <p>P3. Seek feedback from employees, clients and colleagues to</p> |



| | |
|---|---|
| | develop and improve competence |
| CU5. Follow and implement work safety requirements | You must be able to: P1. Identify and report emergency incidents P2. Practice organizational policy and procedures for responding to emergency incidents P3. Identify and implement workplace procedures and work instructions for controlling risks |

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- Healthy work life balance
- Meeting terminologies, structures and arrangements
- Relevant organizational procedures and policies regarding meetings, chairing and minutes.
- Barriers to implement policies and procedures in an organization and possible strategies to address them.

Tool & Equipment

- Note book
- Pen

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

1. A person who demonstrates competency in this unit must be able to provide evidence of the ability to understand workplace policy and procedures. The evidence should integrate employability skills with workplace tasks and job roles and verify competency is able to be transferred to other circumstances and environments



724CO10B-Competency Standard: Perform Advance Communication

Overview: This unit describes the performance outcomes, skills and knowledge required to develop communication skills used professionally. It covers plan and organise work and conduct trainings at workplace, along with demonstrating professional skills independently.

| Competency Unit | Performance Criteria |
|---|---|
| CU1. Demonstrate basic communication skills | <i>You must be able to:</i> P1. Demonstrate different modes of communication: <ul style="list-style-type: none">• Speaking• Reading• Writing• Listening P2. Demonstrate presentation skills through multimedia etc P3. Develop CV according requirements P4. Develop interview skills according to job requirement |
| CU2. Plan and Organize work | <i>You must be able to:</i> P1. Identify task requirements. P2. Plan steps to complete tasks P3. Review planning and organizing process P4. Organize work as per task requirement |
| CU3. Conduct Professional Activities Ethically | <i>You must be able to:</i> P1. Identify the ethical problems P2. Identify affected parties and their interests P3. Evaluate each solution using the interest those involves |

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out the tasks covered in this competency standard. This includes the knowledge of:

- Training skills
- Professional skills
- Advanced language skills
- Assessment and trainees feedback methods
- Direct and indirect communication methods
- The need of the training type at the work place

Tool & Equipment

- Note book
- Pen

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

1. Develop CV
2. Prepare report on plan and organize work



724CO10C-Competency Standard: Establish and Maintain the Occupational Health and Safety System

Overview: This unit covers how to establish, maintain and evaluate an occupational health and safety system in the work environment.

| Competency Unit | Performance Criteria |
|--|---|
| CU1. Carryout Risk assessment at workplace | <i>You must be able to:</i> P1. Identify potential hazards at workplace P2. Evaluate the risk P3. Take corrective/preventive action to mitigate the risk P4. Record your findings P5. Review the risk assessment |
| CU2. Follow emergency response protocol/procedure | <i>You must be able to:</i> P1. Identify emergency exits at workplace P2. Select suitable positions for the P3. Identify assembly area at workplace P4. Follow procedure and instructions to evacuate the building P5. Report immediately at designated assembly area in case of emergency |
| CU3. Perform safe storage and disposal of waste | <i>You must be able to:</i> P1. Identify different types of waste material P2. Identify types of containers to store the different types of waste material P3. Use required labels on storage containers P4. Store the waste materials according to standards P5. Identify types of waste bins P6. Dispose- off waste material according to the safety procedure |
| CU4. Maintain ergonomics condition at workplace | <i>You must be able to:</i> P1. Follow standard working posture/position at workplace P2. Follow standard procedure to provide sufficient light at workplace P3. Use ergonomic workstations to avoid muscle fatigue |

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- Risk assessment at workplace
- Hazard identification
- Ergonomic working condition



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- Hierarchy of control (the preferred order of risk control measures from most to least preferred that is:
 - Elimination
 - Substitution
 - Engineering control
 - Administrative controls
 - And personal protective equipment)
- Types of emergencies at workplace
- Storage and disposal of hazardous material
- Emergency protocol/procedure for fire, hazardous chemical spills, major power failure and terrorism activity and nature disasters
- Current Safety principles and practices used at workplace

Tool & Equipment

- PPEs
- Note book
- Pen
- Safety sign board
- Different Barricades

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Perform risk assessment and hazard identification at the workplace
- Demonstrate safe disposal regarding given hazardous material



724MP14D-Maintain Professionalism in Workplace

Overview: This unit describes the skills and knowledge required to use advanced and specialized communication skills in the client-counselor relationship.

| Competency Unit | Performance Criteria |
|--|---|
| CU.1 Respect Work Timeframes | <i>You must be able to:</i> P1. Demonstrate punctuality in meeting, set working hours and times. P2. Utilize working hours only for working and follow company regulations. P3. Complete work tasks within deadlines according to order of priority P4. Perform extra ordinary during working hours |
| CU.2 Maintain Personal Appearance and Hygiene | <i>You must be able to:</i> P1. Clean hair, body and nails regularly. P2. Wear suitable cloths for the workplace, and respect local and cultural contexts P3. Meet specific company dress code requirements P4. Keep smiling and have positive body language during working hours |
| CU.3 Maintain Adequate Distance with Colleagues and Clients | <i>You must be able to:</i> P1. Respect personal space of colleagues and clients with reference to local customs and cultural contexts. P2. Avoid cross transmission of infections (especially through respiration). |
| CU.4 Work in An Ethical Manner | <i>You must be able to:</i> P1. Follow company values/ethics codes of ethics and/or conduct, policies and guidelines. P2. Use company resources in accordance with company ethical standards. P3. Undertake work practices in compliance with company ethical standards, organizational policy and guidelines. P4. Instruct co-workers on ethical, lawful and reasonable directives. P5. Share Company values/practices with co-workers using appropriate behavior and language. P6. Report works incidents/situations and/or resolved in accordance with company protocol/guidelines. |

Knowledge & Understanding



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The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes:

- Application of good manners and right conduct
- Basic practices for oral and personal hygiene
- Common products used for oral and personal hygiene
- Outline the company code of conduct/values
- Outline the Company regulations, performance and ethical standards
- Work responsibilities/job functions
- Communication skills
- Workplace hygiene standards

Tool & Equipment

- Note book
- Pen

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Prepare a report about professionalism in workplace



724MP14E-Operate Machines for Mining

Overview: This competency standard covers the skills and knowledge required to operate different surface mining machines.

| Competency Units | Performance Criteria |
|--------------------------------------|---|
| CU1. Operate Shovel/Excavator | <p><i>You must be able to:</i></p> <ul style="list-style-type: none">P1. Select appropriate type of equipment attachmentsP2. Carry out start-up, park and shut-down proceduresP3. Operates equipment within recommended speed, engine capability and limitationsP4. Dig and load materialP5. Adjust load as per machine capacityP6. Adjust pushing speed and directionP7. Minimize spillage and contamination through digging and loading techniquesP8. Conduct housekeeping activities |
| CU2. Operate Scraper | <p><i>You must be able to:</i></p> <ul style="list-style-type: none">P1. Select appropriate type of equipment attachmentsP2. Carry out start-up, park and shut-down proceduresP3. Operates equipment within recommended speed, engine capability and limitationsP4. Scrape and load materialP5. Adjust bowl, apron and ejector to ensure constant flow of material from bowlP6. Adjust pushing speed and directionP7. Conduct housekeeping activities |
| CU3. Conduct dozer operations | <p><i>You must be able to:</i></p> <ul style="list-style-type: none">P1. Perform all safety and pre-operational visual checksP2. Carry out start-up, park and shut-down proceduresP3. Operate equipment within recommended speed, engine capability and limitations |



| | |
|--|--|
| | <p>P4. Adjust equipment pushing speed and direction</p> <p>P5. Carry out ripping activities</p> <p>P6. Conduct housekeeping activities</p> |
| CU4. Operate mining dumper operations | <p>You must be able to:</p> <p>P1. Plan and prepare all necessary safety and emergency issues</p> <p>P2. Conduct machine pre-operational checks</p> <p>P3. Adjust engine power to ensure efficiency of truck movements and to minimise damage to the engine and gears</p> <p>P4. Synchronize engine power with gear selection ensuring smooth transition and operation within torque range</p> <p>P5. Operate dumper</p> <p>P6. Monitor road/traffic conditions constantly</p> <p>P7. Position vehicle at load and discharge points with a minimum of manoeuvre</p> <p>P8. Control dumper movements including the raising and lowering of the tray smoothly</p> <p>P9. Assess weight and distribution of load for type of material and size of vehicle</p> <p>P10. Discharge load on slope and/or over face at fill site</p> <p>P11. Dump/spread material evenly</p> <p>P12. Clear, lower and secure tray before resuming travel</p> <p>P13. Clear work area and dispose of or recycle materials</p> |

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes:

- K1.** Surface mining machines
- K2.** Safety standards of operations
- K3.** Manuals for driving instructions
- K4.** Site and equipment safety requirements
- K5.** Materials Safety Data Sheets and materials handling methods

Tool & Equipment

- Tool kit
- Excavator
- Dump truck
- Dozer



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- Scraper
- Safety signs
- PPE

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Operate Shovel/Excavator
- Operate mining dumper operations
- Conduct dozer operations
- Operate scraper



724MP14F-Perform Underground Mining Technique

Overview: This competency standard covers the skills and knowledge required to perform Room and pillar, long wall method for underground mining.

| Competency Units | Performance Criteria |
|--|--|
| CU.1 Perform Room and Pillar Method | <p>You must be able to:</p> <p>P1. Conduct rock face preparation for underground mining</p> <p>P2. Use room and pillar mining method in coal, salt and large ore deposits</p> <p>P3. Identify horizontal plane</p> <p>P4. Create horizontal arrays of rooms and pillar</p> <p>P5. Cut a slot as deep as possible along the bottom of a section of ore</p> <p>P6. Create a pile of ore that is loaded and hauled out of the mine</p> <p>P7. Retreat the mining</p> <p>P8. Maintain all post operation activities</p> |
| CU.2 Perform Long Wall Method | <p>You must be able to:</p> <p>P1. Recognize the limits of long wall mining</p> <p>P2. Fix hydraulic supports</p> <p>P3. Identify the distance for mining</p> <p>P4. Maintain all post operation activities</p> |

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes knowledge of :

- K1.** Room and pillar method
- K2.** Long wall method

Tool & Equipment

- Drill
- Explosive material
- Long wall shearer
- Conveyor belt



- Continues miner
- Hydraulic supports

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Perform different under mining techniques
 - ✓ Room and pillar method
 - ✓ Long wall method



724MP14G- Perform Surface Mining Technique

Overview: This competency standard covers the skills and knowledge required to perform surface mining techniques

| Competency Units | Performance Criteria |
|-------------------------------------|---|
| CU1. Perform Open Pit Mining | <p>You must be able to:</p> <p>P1. Conduct rock face preparation for open pit mining</p> <p>P2. Carry out drill holes for core sampling of ore</p> <p>P3. Generate the Isopach map of ore body</p> <p>P4. Remove top soil and create benches to assess the ore body</p> <p>P5. Carry out drilling and blasting process for extraction of ore</p> <p>P6. Load and transport the required material</p> |
| CU2. Perform Strip Mining | <p>You must be able to:</p> <p>P1. Remove a long strip of overlying soil and overburden rock</p> <p>P2. Carry out drill holes</p> <p>P3. Collect the core samples of ore deposit</p> <p>P4. Generate the Isopach map of ore body</p> <p>P5. Remove top soil</p> <p>P6. Carry out drilling and blasting process</p> <p>P7. Load and transport the required material</p> |
| CU3. Perform Placer Mining | <p>You must be able to:</p> <p>P1. Collect the sample as per required procedure</p> <p>P2. Apply the following methods for up gradation of ore</p> <ol style="list-style-type: none"> Panning Rocker box Sluice box Dry washing Trommel (Optional) |

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes knowledge of:



- K3.** Importance of pit mining
- K4.** Bench formation
- K5.** Ore identification
- K6.** Understand how to perform placer mining method

Tool & Equipment

- Drilling machine
- Explosive material
- Excavator
- Dozer
- Dumpers
- Jackhammer
- Pan
- Rocker box
- Sluice box
- Trommel (Optional)

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Perform different surface mining techniques
 - ✓ Open pit mining
 - ✓ Strip mining
 - ✓ Placer mining



724MP14H- Install Ground Support

Overview: This competency standard covers the skills and knowledge required to install ground support for mining excavation and transportation.

| Competency Units | Performance Criteria |
|---|---|
| CU1. Prepare for Installation | You must be able to: P1. Select & wear PPEs P2. Select ground support equipment P3. Remove all surface soils and vegetation P4. Scale down loose material P5. Position drill holes according to ground support plan |
| CU2. Assemble and Install Ground Support | You must be able to: P1. Assemble anchors to full depth P2. Drill holes to specified diameter and depth P3. Install and tension anchors and bolt to pattern and tensioning degree P4. Install water suppression devices minimizing water infiltration to ground supports P5. Check ground support periodically and adjusts stressing P6. Perform housekeeping activities |

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes knowledge of :

- K1.** De-watering procedures and characteristics
- K2.** Drilling procedures
- K3.** Ground support characteristics and applications

Tool & Equipment

- Water suppressing device
- Ancillary equipment (generators, pumps, lights, compressors, cleaning equipment, power tools, hand tools)
- Cutting implement
- Drill rigs



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- Lifting and handling equipment (winch, crane, block and tackles)

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Perform assembling and installation of ground support



724MP14I- Operate Underground Mining Machines

Overview: This competency standard covers the skills and knowledge required to operate underground mining machines.

| Competency Units | Performance Criteria |
|--|--|
| CU1. Operate Mining Drill | <p><i>You must be able to:</i></p> <p>P1. Select & wear PPEs</p> <p>P2. Select equipments</p> <p>P3. Carry out start-up, park and shut-down procedures</p> <p>P4. Adjust bowl, apron and ejector</p> <p>P5. Adjust pushing speed and direction</p> <p>P6. Operates equipment</p> <p>P7. Scrape and load material</p> <p>P8. Perform housekeeping activities</p> |
| CU2. Operate Underground Loader | <p><i>You must be able to:</i></p> <p>P1. Select & wear PPEs</p> <p>P2. Select equipments</p> <p>P3. Carry out start-up, park and shut-down procedures</p> <p>P4. Adjust bowl, apron and ejector</p> <p>P5. Adjust pushing speed and direction</p> <p>P6. Operates equipment</p> <p>P7. Scrape and load material</p> <p>P8. Perform housekeeping activities</p> |
| CU3. Operate Crane Lift | <p><i>You must be able to:</i></p> <p>P1. Select & wear PPEs</p> <p>P2. Select equipments</p> <p>P3. Carry out start-up, park and shut-down procedures</p> <p>P4. Adjust bowl, apron and ejector</p> <p>P5. Adjust pushing speed and direction</p> <p>P6. Operates equipment</p> <p>P7. Scrape and load material</p> |



| | |
|--|---|
| | P8. Perform housekeeping activities |
| CU4. Operate Shotcrete Machine | <i>You must be able to:</i> P1. Select & wear PPEs P2. Select equipments P3. Carry out start-up, park and shut-down procedures P4. Adjust bowl, apron and ejector P5. Adjust pushing speed and direction P6. Operates equipment P7. Scrape and load material P8. Perform housekeeping activities |
| CU5. Operate Machines in Long Wall Mining | <i>You must be able to:</i> P1. Select & wear PPEs P2. Select equipments P3. Carry out start-up, park and shut-down procedures P4. Adjust bowl, apron and ejector P5. Adjust pushing speed and direction P6. Operates equipment P7. Scrape and load material P8. Perform housekeeping activities |

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes knowledge of:

- K1.** Different Under mining machines its procedures
- K2.** Different parts of under mining machines

Tool & Equipment

- Mining drill
- Shotcrete machine
- Crane Lift
- Underground loader

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Operate different under mining machines



724MP14J-Carryout Dredging Operations

Overview: This competency standard covers the skills and knowledge required to evaluate dredging operations.

| Competency Units | Performance Criteria |
|---|---|
| CU1. Dredge materials | <p>You must be able to:</p> <p>P1. Operate dredger on central-line P2. Adjust radius of swing P3. Monitor and adjusts dredge indicators P4. Adjust position of dredge using adequate float line P5. Cut out hard materials P6. Complete all required records and documentation</p> |
| CU2. Perform retreat | <p>You must be able to:</p> <p>P1. Get clearances from operational plant operators P2. Maintain dredge on center line at full swing limit P3. Adjust tonnage during the retreat P4. Adjust spuds and carriage way P5. Completes all required records and documentation</p> |
| CU3. Conduct Centre-line changes | <p>You must be able to:</p> <p>P1. Gain relevant clearances and visual checks before center-line change P2. Adjust cable line and float line P3. Align dredge with center line indicators P4. Maintain full swing and adjusts spuds and carriage way P5. Completes all required records and documentation</p> |
| CU4. Conduct anchor moves | <p>You must be able to:</p> <p>P1. Halt ladder swinging and maintains full feed P2. Pay out ample length of cable P3. Move anchors alternately, at a safe speed and to the required positions P4. Move anchor to minimize downtime</p> |



| | |
|---|--|
| | P5. Completes all required records and documentation |
| CU5. Conduct side-line cable replacement | You must be able to: P1. Lower auxiliary spud, raises ladder and flushes plant out before side-line cable is replaced P2. Remove existing cable from drum P3. Track new cable on drum P4. Move cable to batter using transportation method P5. Tension cable onto drum P6. Connect cable to anchor P7. Complete documentation as per given format |
| CU6. Conduct plant moves | You must be able to: P1. Conduct plant movement according to mine plan P2. Maintain adequate float line on pond, avoiding breakage or damage to float line P3. Complete documentation as per given format |

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes knowledge of:

- K1.**Dredging
- K2.**Dredging techniques
- K3.**Anchoring techniques

Tool & Equipment

- Dredging machine and equipment
- Attachments
- Tool kit

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Carry out dredging operations



724MP14K- Perform Basic Green Skills at Mining Site

Overview: This unit describes the performance outcomes, skills and knowledge required to perform basic green skills for mining. It will also allow you to manage sustainability of materials used at mining and waste at site .Your underpinning knowledge will be sufficient to provide you the basis for your work.

| Competency Units | Performance Criteria |
|--|--|
| CU1. Manage sustainability of materials used at crush plant | You must be able to: P1. Select sustainable raw materials as per requirement P2. Follow standard procedure to manage systems (waste, energy, water) P3. Perform impact quantification of used material at crush plant |
| CU2. Manage crush plant waste | You must be able to: P1. Identify various types of waste at site P2. Sort and categorize reusable waste P3. Dispose unusable waste as per set standards P4. Place reusable material at designated storage area P5. Transport waste material to designated place |

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes knowledge of:

- Environmental degradation
- Types of raw materials at crush plant
- Types of waste
- Waste reduction techniques
- Concept of 6 R approach (Reduce, Reuse, Recycle, Repair, Renew, and Rethink)
- Reusable materials
- Recyclable materials
- Methods for disposal of unusable materials
- Just-in-time (JIT) approach Basic knowledge



Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:

- Fill checklist of incorporating waste/reusable materials, wastage controls, and resources management as per instructions.
- Prepare impact assessment report of material used at site



COMPLETE LIST OF TOOLS AND EQUIPMENT

| Sr. # | Description |
|-------|---|
| 1. | Computer system |
| 2. | White board |
| 3. | Printer |
| 4. | Multimedia |
| 5. | Safety Helmets |
| 6. | Blankets |
| 7. | Board of Safety instructions. |
| 8. | Ear Plug |
| 9. | Face mask |
| 10. | Fire Buckets. |
| 11. | Fire Extinguishers |
| 12. | First aid Kit |
| 13. | Hand gloves |
| 14. | Hooks / Anchors |
| 15. | Manufacturers Operation and Maintenance Manual & Video; |
| 16. | Measuring Tape |
| 17. | Multimeter |
| 18. | Safety Apron |
| 19. | Safety Belts |
| 20. | Safety goggles |



National Competency Standards for “Assistant Supervisor in Mining Process Technology”



| | |
|-----|--------------------------------|
| 21. | Safety harness |
| 22. | Safety net |
| 23. | Safety Shoes |
| 24. | Long wall shearer |
| 25. | Explosive material |
| 26. | Slings |
| 27. | Spatula |
| 28. | Scraper |
| 29. | Stretcher |
| 30. | Various hand / power tools |
| 31. | Scanner |
| 32. | Dozer |
| 33. | Dumpers |
| 34. | Dump truck |
| 35. | Excavator |
| 36. | Drill rigs |
| 37. | Drill |
| 38. | Cameras |
| 39. | Tool kit |
| 40. | Conveyors |
| 41. | Dredging machine and equipment |
| 42. | Steel Rules |



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|-----|---|
| 43. | Tri Square |
| 44. | Vernier Caliper |
| 45. | Underground loader |
| 46. | Crane Lift |
| 47. | Shotcrete machine |
| 48. | Mining drill |
| 49. | Snap Gauge set |
| 50. | Lifting and handling equipment (winch, crane, block and tackles) |
| 51. | Set of Adjustable Wrench |
| 52. | Set of Spanners (Open end, Ring) |
| 53. | Pipe wrench |
| 54. | L-key sets |
| 55. | Nose pliers |
| 56. | Grip pliers |
| 57. | Cutting implement |
| 58. | Ball peen Hammer |
| 59. | Claw Hammer |
| 60. | Ancillary equipment (generators, pumps, lights, compressors, cleaning equipment, power tools, hand tools) |
| 61. | Water suppressing device |
| 62. | Continuous miner |
| 63. | Drilling machine |



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|-----|--------------------|
| 64. | Hydraulic supports |
| 65. | Jackhammer |
| 66. | Pan |
| 67. | Rocker box |
| 68. | Sluice box |
| 69. | Trommel (Optional) |