



National Vocational Certificate Level 5 in Crush Plant Technology (Crush Plant Site Manager)



Competency Standards

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



National Competency Standards For National Vocational Certificate Level 5 in Crush Plant Technology (Crush Plant Site Manager)

NVQF Level 5

DACUM Facilitator: Ms.Saima Asghar

NAVTTTC Coordinator: Mr. Mohammad Ishaq– Deputy Director SS&C, NAVTTTC HQs.



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INTRODUCTION

Mining and construction Industries are the booming industries of Pakistan and Middle East. There is an increasing demand of the jobs related to Crushing Plant. Therefore, the skills are required to be inducted in the future generation. If an individual is planning to pursue a career in crushing plant, this program will be helpful in targeting various projects in Pakistan and other countries etc.

Keeping in view of the above the competency based national vocational qualifications have been developed by NAVTTC to train the unskilled human resource on the technical and entrepreneurial skills to be employed / self-employed and inevitably set sustainable impact on their lives by increase in their livelihood income.

Training Course is based on competency standards which are defined by the industry and the traditional role of a trainer changes and shifts towards the facilitation of training. A trainer encourages and assists trainees to learn for themselves. Trainees are likely to work in groups (pairs) and all doing something different. Some are doing practical tasks in the workshop, some writing, some not even in the classroom or workshop but in another part of the building using specialist equipment, working on computers doing research on the Internet or the library. As trainees learn at different pace they might well be at different stages in their learning, thus learning must be tailored to suit individual needs. The following facilitation methods (teaching strategies) are generally employed

PURPOSE OF THE QUALIFICATION

The purpose of the training is to provide skilled manpower to improve the existing mining industry. This will improve the quality in mining sector and the availability of skilled professionals will bring socio-economic benefits to all stakeholders. The specific objectives of developing these qualifications are as under:

- Improve the professional competence of crushing
- Capacitate the local community and trainers in modern CBT training, methodologies and processes as envisaged under NVQF



- Provide flexible pathways and progressions in the mining sector
- Enable the trainees to perform their duties in efficient manner
- Establish a standardized and sustainable system of training for crushing plant technology in Pakistan

DATE OF VALIDATION

This national vocational qualification (NVQ) has been validated by the Qualifications Development Committee (QDC) in 4th Oct to 8th Oct 2021 and will remain in currency until 10th October 2031.

*Shall be reviewed after 3 years

CODE OF QUALIFICATION

Qualification Title	Code
National Vocational Certificate Level 5 in Crush Plant Technology “Crush Plant Site Manager”	724CO11

ENTRY REQUIREMENTS

- For National Vocational Certificate Level-5 in “Crush Plant Site Manager”, the entry requirement is award of National Vocational Certificate Level-4 in “Crushing Plant Technician/Supervisor”. The entry in informal sector is not prescribed.



QUALIFICATIONS DEVELOPMENT COMMITTEE

The following members participated in the qualification development of these qualifications:

Sr. No.	Name	Designation	Organization
1.	Saima Asghar	DACUM Facilitator	CBT Expert/Certified Assessor
2.	Mohammad Ishaq	Coordinator	Deputy Director NAVTTC, Islamabad
3.	Engr.Azhar Iqbal Shad	Principal	GCT , Raiwand road Lahore
4.	Engr.Nadeem Zaghim	Senior Instructor Civil	GCT ,Raiwand road Lahore
5.	Sikandar Hayat	Instructor	GCT ,Raiwand road Lahore
6.	Engr.Imran Murtaza	Lab Engineer Civil	University of South Asia, Lahore
7.	Engr.Hassan Ali	Site Engineer(Civil)	Punjab Engineering Construction Service Lahore
8.	Atif Waheed	Senior Instructor	NLC Dina
9.	Engr.Muhammad Asad Saleem	Project Engineer	Habib Construction Services, Lahore
10.	Engr.Amina Irfan	Lecturer	The University of Lahore
11.	Engr.Umer Farooq	Instructor	GSPCT Gujrat
12.	Engr.Haroon Ejaz	Site Engineer	DHA Multan
13.	Mr.Hassan Raza	Instructor	CTTI Islambad
14.	Engr.Mehr Ali Qurashi	Senior Service Manager	Jaffar Brother Islambad
15.	Engr.Taimoor Iftikhar	Site Supervisor	Hadi Construction KPK



VALIDATION COMMITTEE

The following members participated in the qualification development of these qualifications:

Sr. No.	Name	Designation	Organization
1.	Saima Asghar	DACUM Facilitator	CBT Expert/Certified Assessor
2.	Mohammad Ishaq	Coordinator	Deputy Director NAVTTC, Islamabad
3.	Engr.Azhar Iqbal Shad	Principal	GCT , Raiwand road Lahore
4.	Muhammad Abdul Moez	Structural Engineer	Rizwan Mirza Consulting Engineer, Lahore
5.	Mr. Atif Waheed	Instructor	CMT,NLC Dina
6.	Mr. Sikandar Hayat	Instructor	GCT ,Raiwand road Lahore
7.	Mr. Ahsan Shahbaz	Manager HSE	Pak Safety Solution, Lahore
8.	Mr. Abdul Samad	Construction Contractor (CBT Assessor)	Faisalabad
9.	Engr.Haroon Ejaz	Site Engineer	DHA Multan
10.	Mr. Munawar Husain	Secretary	PBT Lahore
11.	Mr. Khalid Mahmood	Ex-Principal	GATC Sialkot, Mechanical Power Lahore
12.	Syed Mansoor Ahmed	Assistant IT Manager, NVQF Registry Incharge	SBTE Sindh
13.	Mr. Israr Ahmad	Secretary ,BTE	KPK
14.	Engr.Liaqat Ali Jamhroo	Director, Academics	STEVT
15.	Ms. Sumbal Ayaz	Curriculum Expert	British Council Lahore



SUMMARY OF COMPETENCY STANDARDS

Code	Competency Standards	Level	Theory		Practical		Total	
			C	Hr.	C	Hr.	C	Hr.
1.	Manage Safety at Crushing Plant Site	5	2.4	24	3.6	36	6	60
2.	Apply and Testing Basic Electronic Components	5	4	40	6	60	10	100
3.	Perform Sampling of Crushing Material	5	3.6	36	5.4	54	9	90
4.	Perform Testing of Stones before Crushing	5	4.8	48	7.2	72	12	120
5.	Perform Quality Test on Coarse Aggregates	5	4.8	48	7.2	72	12	120
6.	Manage and Supervise the Job Activities	5	3.2	32	4.8	48	8	80
7.	Plan for Owning and Operating Crushing Plant	5	2.4	24	3.6	36	6	60
8.	Plan a Project in Primavera P6	5	6	60	9	90	15	150
9.	Install & Commissioning of Crushing Plant	5	3.2	32	4.8	48	8	80
10.	Develop Entrepreneurial Skills	5	1.6	16	2.4	24	4	40
11.	Practice Professionalism	5	112	120	18	180	30	300
Total			41	410	79	790	120	1200



724CO11A-Competency Standard: Manage Safety at Crushing Plant Site

Overview: This competency standard covers the skills and knowledge required to implement and maintain safe working practices at site. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Implement safe working practices at site	<i>You must be able to:</i> P1. Carry out tool box talks which require discussion on critical safety matters and hazardous site conditions pertaining to particular work etc. P2. Practice of Personal Protective Equipment (PPE) P3. Implement health and safety practices and ensure it is followed by subordinates P4. Implement safe handling and stacking methods at workplace / store P5. Perform appropriate posting of safety signs and boards at designated places) P6. Barricade all un-protected openings at the workplace P7. Implement and check near miss reporting P8. Provide safe access at work place for movement of workers & materials. P9. Conduct emergency response drill for enhancing importance of safety among the workers as per the policy of organization
CU2. Maintain safe work environment	<i>You must be able to:</i> P1. Use defined safe work practices and personal protective equipment to ensure personal safety at the workplace P2. Collect and/or dispose of all waste in accordance with environmental requirements and workplace procedures P3. Check condition and serviceability of equipment before storage.



CU3. Report and Investigate the accident at plant site	<p><i>You must be able to:</i></p> <p>P1. Identify any injured employee and check severity of the injury</p> <p>P2. Provide first aid treatment if required</p> <p>P3. Interview injured person and other involved personnel in the accident</p> <p>P4. Collect all information related to the incident/accident at workplace</p> <p>P5. Analyse the facts and figures by observing the accident scene</p> <p>P6. Review your recording</p> <p>P7. Perform risk assessment and hazard identification at the workplace</p> <p>P8. Develop the incident report along with corrective measures to avoid future accidents</p>
CU4. Follow vehicle safety at workplace	<p><i>You must be able to:</i></p> <p>P1. Follow the speed limit as per the company policy while driving vehicle at site</p> <p>P2. Use high visibility safety vest</p> <p>P3. Keep flag man while driving/reversing vehicle in operational areas</p> <p>P4. Follow standard procedure related to vehicle safety at workplace</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 the knowledge of:

- Unsafe act and unsafe conditions
- Physical hazards at work site and its controlling measures
- Standard procedure of handling, storing and stacking of hazardous materials
- Safe disposal of hazardous waste
- Effect of air pollution on health
- Procedures in cases of breaches of site safety, accidents, and emergency situations as per guidelines
- Risk assessment and hazard identification
- Accident investigation procedure and format of accident report.
- Vehicle safety at workplace



Critical Evidence(s) Required

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

- Investigate work site accident and develop the incident report along with corrective measures to avoid future accident.
- Perform risk assessment at the workplace
- Demonstrate vehicle driving safety as per policy of the organization



724CO11B-Competency Standard: Apply and Testing Basic Electronic Components

Overview: This competency standard covers the skills and knowledge required to recognize various the basic electronic components, types of sensors and transducers, test sensor / transducer voltage with multi-meter and maintenance and troubleshooting. After this competency standard the candidate will be able to identify variety of basic electronic components and their usage in industry.

Competency Units	Performance Criteria
CU1. Recognize basic electronic components	You must be able to: P1. Identify diodes P2. Identify its types & polarities P3. Identify resistor & its types P4. Recognize color coding of resistor P5. Identify capacitor & its types P6. Recognize coding & rating of capacitor
CU2. Recognize basic types of Sensors and Transducers	You must be able to: P1. Identify temperature sensors P2. Identify pressure sensors P3. Identify speed sensors P4. Identify position sensors P5. Identify voltage sensors P6. Identify current sensors P7. Identify temperature transducers P8. Identify motion transducers (Speed, Velocity, Acceleration) P9. Identify vibration transducer P10. Identify pressure transducer
CU3. Test sensor / transducer voltage with multi-meter	You must be able to: P1. Check connecting pins of sensor/transducer P2. Apply required power to transducer/sensor power pins P3. Connect signal pin with multi-meter P4. Write down the obtained data P5. Compare the data with transducer/sensor datasheet



CU4. Detect and diagnose faults	<i>You must be able to:</i> P1. Check cable connections P2. Check power supply P3. Check the status of LEDs on Power Supply, CPU, I/O Cards P4. Contact resistance, signal electrical parameters P5. Put PLC in test mode P6. Check protective devices P7. Check emergency stop buttons P8. Check connection points of input and output devices P9. Test software
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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:

- Diodes, polarities & their applications in circuits
- Capacitor& their applications in circuits
- Inductor& their applications in circuits
- Transducer and its types
- Sensor and its types
- Resistor and its types
- Troubleshoot frequently occurring errors, causes and preventive measures repairing/replacement of various components in a PLC(Programmable Logic Controller)

Critical Evidence(s) Required



The candidates need to produce following Critical Evidence(s) in order to be competent in this competency standard.

- Identification of resistor, capacitor, inductor
- Testing of sensors and transducers
- Detect and diagnose faults



724CO11C-Competency Standard: Perform Sampling of Crushing Material

Overview: This competency standard covers the skills and knowledge required to perform sampling of crushing material. You will be able to collect aggregate and stone samples and preserve, document, handle, store and transport the sample. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Carry Out Initial Preparatory Activities	You must be able to: P1. Select sampling equipment, sample container and accessories P2. Identify faulty or unsafe components and equipment P3. Clean/decontaminate the sample container and sampling tools P4. Plan work sequences for optimum efficiency and safety for collection of multiple samples.
CU2. Collect Aggregates Samples	You must be able to: P1. Collect required quantity of aggregates samples as per sampling plan P2. Take photos/snaps of sampling sites and samples P3. Perform sample preparations(washing, weighing, & sieving) in required quantity of material P4. Record sample appearance, environmental conditions and any other factors
CU3. Collect Stone Samples	You must be able to: P1. Collect required quantity of stone samples from the stacks as per sampling plan P2. Take photos/snaps of sampling sites and samples P3. Perform test as per standard procedure for determining the physical properties of stone



	<p>P4. Carry out weighing and packing of sample as per standard sampling procedure</p> <p>P5. Record sample appearance, environmental conditions and any other factors that may impact on sample integrity</p>
CU4. Preserve and Document the Sampling	<p>You must be able to:</p> <p>P1. Prepare sub-samples and back-up sub-samples that are representative of the source</p> <p>P2. Seal the sample & sub-samples in the presence of witnesses</p> <p>P3. Label samples in accordance with traceability requirements</p> <p>P4. Complete the sampling document; fill in the sample date, time, weight/volume, sample ID, preservative used, sample location and sampler name etc.</p>
CU5. Handle, Store & Transport The Samples	<p>You must be able to:</p> <p>P1. Store sub-samples in accordance with the sampling procedure & rules for maintaining the sample integrity and traceability</p> <p>P2. Deliver sample store reception point in accordance with standard of operating procedures</p> <p>P3. Report any unwanted situation to management</p>

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:

- Types and properties of stones
- Methods of collecting test samples based upon the types of tests and materials.
- Sampling rules for various materials such as; no. of samples, witnesses and sealing of samples etc.



- Sampling tools and equipment, sample container, quantity of each sample, weighing, measuring, sieving as per type of sample and tests.
- Practice of tagging/numbering/labelling the collected samples.
- Procedures of packing of test samples for transportation.
- Practice for storing and stacking the test samples of various materials as per standards.
- Sampling documents

Critical Evidence(s) Required

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

- Select and check all required field equipment, instruments and materials and safely transporting it from site.
- Obtaining representative samples in accordance with sampling plan, pre-treatment, preservation, storage.
- Label samples and sub-samples to satisfy traceability requirements of the enterprise / accreditation.



724CO11D-Competency Standard: Perform Testing of Stones before Crushing

Overview: This competency standard covers the skills and knowledge required to perform testing of stone before crushing. You will be able to perform Absorption & Moisture Content for stone samples, durability test for stone samples, Attrition /abrasion test for stone samples and Crushing Strength test for stones Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Carry out initial preparatory activities	<i>You must be able to:</i> P1. Prepare workplace for task P2. Interpret test request to confirm samples to be tested P3. Collect required equipment and materials P4. Plan task sequences for optimum efficiency
CU2. Perform water Absorption test for stone samples	<i>You must be able to:</i> P1. Collect sample P2. Weight the sample P3. Dip sample in water for specified time P4. Differentiate sample weight P5. Calculate percentage of absorption P6. Record test data in register
CU3. Perform durability test for stone samples	<i>You must be able to:</i> P1. Collect sample P2. Drop sample from specified height on hard surface P3. Segregate the sample P4. Calculate average weight of samples P5. Maintain record in register



CU4. Perform abrasion test for stone samples	<p><i>You must be able to:</i></p> <p>P1. Collect samples in required numbers and weight</p> <p>P2. Put sample in drum in specified numbers</p> <p>P3. Lock the Drum</p> <p>P4. Check angle of inclination for drum</p> <p>P5. Rotate drum for specified revolutions and time</p> <p>P6. Open Drum Safely</p> <p>P7. Clean & Weigh the samples</p> <p>P8. Compute result percentage</p> <p>P9. Maintain Test record in register</p>
CU5. Perform Crushing Strength test for stones	<p><i>You must be able to:</i></p> <p>P1. Select sample</p> <p>P2. Apply Capping</p> <p>P3. Fix stone in Compressive testing machine</p> <p>P4. Apply load at convenient rate on fixed sample</p> <p>P5. Note crushing strength</p> <p>P6. Maintain record in register</p>

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:

- Types of physical test
- Operations of physical tests.
- Importance of physical tests
- Techniques of physical test
- Capacity of physical test equipment
- Measuring tools and techniques
- Sizes and uses stones in samples



- Importance of abrasion test for materials
- Type of different Stones and its properties
- Porosity
- Introduction to Compressive / Crushing Strength test for samples.
- Techniques of Compressive / impact tests
- Capacity of Crushing equipment / machine
- Measuring tools and techniques
- Differentiate between Hardness and Crushing strength
- Weight and its types

Critical Evidence(s) Required

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

- Perform water Absorption test for stone samples
- Perform durability test for stone samples
- Perform abrasion test for stone samples
- Perform Crushing Strength test for stones



724CO11E-Competency Standards: Perform Quality Test on Coarse Aggregates

Overview: This competency standard covers the skills and knowledge required to perform quality test on coarse aggregates. You will be able to perform gradation test, flaky & elongated particles test, Los Angeles abrasion test, aggregate impact value test and aggregate crushing value test. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Carry out initial preparatory activities.	<i>You must be able to:</i> P1. Prepare workplace for task P2. Interpret test request to confirm samples to be tested P3. Collect required equipment and materials P4. Plan task sequences for optimum efficiency
CU2. Perform Gradation Test	<i>You must be able to:</i> P1. Prepare the samples as per standard guidelines P2. Select the appropriate sieve set as per requirements P3. Carry out the sieving procedure P4. Compute the results of the test P5. Record the test result
CU3. Compute Specific Gravity and water absorption of aggregate	<i>You must be able to:</i> P1. Prepare the test samples P2. Select the apparatus to be used in gravity and water absorption of aggregate P3. Conduct the test as per standard P4. Compute the results of the test P5. Record the test result



CU4. Perform Flaky & Elongated Particles test on aggregate	<p><i>You must be able to:</i></p> <p>P1. Prepare the test samples</p> <p>P2. Select the apparatus to be used in flaky & elongated particles test</p> <p>P3. Conduct the test</p> <p>P4. Compute the results of the test</p> <p>P5. Record the test result</p>
CU5. Perform Los Angeles Abrasion Test for A & B class Material	<p><i>You must be able to:</i></p> <p>P1. Prepare the test samples</p> <p>P2. Select the apparatus to be used in Los Angeles abrasion test</p> <p>P3. Conduct the test</p> <p>P4. Compute the results of the test</p> <p>P5. Record the test result</p>
CU6. Perform the Aggregate Impact Value Test	<p><i>You must be able to:</i></p> <p>P1. Prepare the test samples</p> <p>P2. Select the apparatus to be used in aggregate impact value test</p> <p>P3. Conduct the test</p> <p>P4. Compute the results of the test</p> <p>P5. Record the test result</p>
CU7. Execute the Aggregate Crushing Value Test	<p><i>You must be able to:</i></p> <p>P1. Prepare the test samples</p> <p>P2. Select the apparatus to be used in aggregate crushing value test</p> <p>P3. Conduct the test</p> <p>P4. Compute the results of the test</p> <p>P5. Record the test result</p>

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:

- Classification of aggregates according to nature of formation, size and shape
- Characteristics of good fine and coarse aggregates
- Fine aggregates (Fineness, impurities) and on coarse aggregates (sieve analysis, Flakiness, elongation and Specific gravity)
- Effects of bulking of sand
- Importance of gradation of aggregates
- Sieve analysis
- Test procedures for Specific Gravity & Unit weight
- Abrasion and process of Los Angeles Abrasion Test
- Test procedures for Aggregate Crushing value & Aggregate impact Value Tests

Critical Evidence(s) Required

The candidate needs to produce any or all of the following documents/evidences:

- Perform Flaky & Elongated Particles test on aggregate
- Perform the Los Angeles Abrasion Test on aggregate
- Perform the Aggregate Impact Value Test
- Compute the Specific Gravity and water absorption of the aggregate
- Perform the Aggregate Impact Value Test
- Execute the Aggregate Crushing Value Test



724CO11F -Competency Standard: Manage and Supervise the Job Activities

Overview: This competency standard covers the skills and knowledge required to manage and supervise the job activities. You will be able to plan and supervise on-site operations / activities and doing the on - site inspection and prepare a report .Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Plan for on-site operations	<p>You must be able to:</p> <p>P1. Consult with the client to obtain required information</p> <p>P2. Prepare SOP's in accordance with the identified requirements.</p> <p>P3. Prepare the process flow diagram in order to achieve Quality outcome.</p> <p>P4. Break down work of activities into small achievable components and efficient sequences</p> <p>P5. Recognize site hazards and the personal protective equipment (PPE) and safety procedures specified for job</p> <p>P6. Organize site induction for support personnel as required</p> <p>P7. Plan housekeeping activities prior to and post completion of work</p>
CU2. Supervise work activities to achieve desired results	<p>You must be able to:</p> <p>P1. List and arrange required resources prior to commencement of work</p> <p>P2. Recognize the areas of work which could result in a delay of work, wastage of material or damage to tools.</p> <p>P3. Allocate responsibility to required team members to avoid conflicts</p> <p>P4. Review work plan in response to new information, urgent requests, changed situations or instructions from concern personnel</p>



	P5. Cooperate with team members to achieve common goals
CU3. Perform on- site inspection	<p>You must be able to:</p> <p>P1. Conduct inspection of processes & materials according to inspection plan</p> <p>P2. Identify defects and deficiencies in product & processes</p> <p>P3. Record defects and deficiencies with evidence in product & processes (if required)</p> <p>P4. Perform test as per standard procedure for determining the physical properties of materials and product.</p> <p>P5. Collect the samples of materials & products for lab testing as per standards</p> <p>P6. Complete the sampling document as per requirement</p> <p>P7. Check the actions taken for rectification of snag list</p> <p>P8. Record the non-compliance and expected breaches of contract as per SOPs.</p>
CU4. Prepare the inspection report.	<p>You must be able to:</p> <p>P1. Collect and review the information relevant to inspection activities for recoding inspection results</p> <p>P2. Verify the integrity of information supplied by other party as a part of the inspection process</p> <p>P3. Record inspection observations and findings</p> <p>P4. Recommend the necessary corrective actions for tackling the identified problems</p>

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:



- Principles of planning and project management
- Roles and responsibilities for different levels of site supervision.
- Information relevant to inspection activities and work document preparation for recoding inspection results.
- Documentation and record system of the inspection body
- Different types of deficiencies in inspection activities
- Site problems and recommended corrective actions
- Awareness of environmental sustainability issues as they relate to the work task.

Critical Evidence(s) Required

The candidate needs to produce any or all of the following documents/evidences:

- Design effectively the supervision and inspection program in accordance with specifications
- Handle inspection items and samples by appropriate methods to meet the traceability requirements.
- Collaborate with the team members for allied works at crushing plant site.



724CO11G- Competency Standard: Plan for Owning and Operating Crushing Plant

Overview: This competency standard covers the skills and knowledge required to plan for owning and operating crushing plant. You will be able to calculate depreciation of plant/machinery, maintenance cost of machines, estimation and determinate the productivity of crushing plant etc. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Calculate depreciation of plant/machinery	You must be able to: P1. Estimate The purchase price of equipment P2. Estimate the 'Recovery' period P3. Estimate the salvage value P4. Select the method of depreciation as per data P5. Compute the depreciation by selected formula
CU2. Maintenance Cost of machines	You must be able to: P1. Interpret the operational manual of machines for maintenance. P2. Calculate the hourly and annual maintenance cost
CU3. Estimate operating cost	You must be able to: P1. Identify capacity and capability of engine P2. Calculate fuel and lubricant cost P3. Calculate tire cost P4. Calculate operator man hours P5. Calculate total operating cost



CU4. Determine productivity of crushing plant ,Wheel Loader dumper truck	You must be able to: P1. Identify factors affecting productivity P2. Gather data required for productivity calculation. P3. Compute productivity of crushing plant,wheel loader and dumper truck.
CU5. Calculate the cost of owning for crushing plant and its attachments	You must be able to: P1. Gather data about initial cost P2. Gather calculated miscellaneous cost P3. Compute total ownership cost

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:

- Principles of management
- Importance of management.
- Factors affecting depreciation.
- Basic terminology's of depreciation.
- Types of cost.
- Importance of determining cost.
- Steps involved in calculating the total ownership cost.
- Aspects of ownership cost.
- Need for determining ownership cost.
- Concept of cost.
- Importance of operating cost.
- Components of operating cost
- Importance of productivity.

Critical Evidence(s) Required

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



- Calculate the depreciation cost of plant
- Calculate the Operating cost of plant
- Calculate the cost of maintenance of plant
- Calculate productivity of the plant
- Calculate the cost of owning of plant



724CO11H- Competency Standard: Plan a Project in Primavera P6

Overview: This competency standard deal with learning the competencies needed to plan a project in Primavera P6. You can perform basic operation, project activities scheduling and resources costing and planning Primavera P6. You will manage project in Primavera P6. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Perform Basic operation in Primavera P6	<i>You must be able to:</i> P1. Load & unload primavera P6 Software. P2. Prepare interface of software P3. Customize P6 Screen Layout P4. Create WBS of project in Primavera.
CU2. Perform Project Activities Scheduling in Primavera P6	<i>You must be able to:</i> P1. Add Project in Primavera P2. Create Activities of project in Primavera. P3. Create Relationships between activities of project in Primavera. P4. Create Schedule of activities of project in Primavera. P5. Display Gantt Chart
CU3. Perform Project Resources Costing & Planning in Primavera P6	<i>You must be able to:</i> P1. Add constraints of activities of project in Primavera. P2. Create Calendar for activities of project in Primavera. P3. Assign Calendars to activities of project in Primavera. P4. Add Resources to activities of project in Primavera. P5. Assign Resources of activities of project in Primavera. P6. Add Cost of activities of project in Primavera. P7. Analyze Resources of activities of project in Primavera. P8. Perform Baseline process for Project.
CU4. Manage Project in Primavera P6	<i>You must be able to:</i> P1. Status the Project P2. Mitigate the schedule

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:

- Physical performance to Customized screen layout
- Activity Constraints
- Work calendar, work/non-work days, working hours
- Roles and Hourly Rates
- Baselines and describe their use in evaluating project performance
- Stages of project execution
- Project monitoring and control

Critical Evidence(s) Required

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

- Managed Project - project progress, planned baseline, Resource leveling and describe its purpose, comparison graphically, project progress for a specified time period



724CO11I- Competency Standard: Install & Commissioning of Crushing Plant

Overview: This competency standard identifies competencies required to conduct the installation & commissioning of crushing plant in accordance with quality requirements. He will be able to interpret the installation drawing, coordinate the installation of plant and perform test run of plant. Your underpinning knowledge regarding entrepreneurial skills will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Interpret Installation drawing through instruction manual	<i>You must be able to:</i> P1. Elaborate installation drawings of the plant P2. Select location of in/out and the dump yard P3. Mark the position of components of plant on the land
CU2. Perform commissioning activities	<i>You must be able to:</i> P1. Interpret Installation drawing through instruction manual P2. Identify risk of falling hazards P3. Remove temporary sealing and transport straps P4. Inspect visually for any impact damage and leakage of oils etc P5. Check all safety devices are in place P6. Coordinate with rigger for erection of plant units as per Installation drawings P7. Align the conveyors, hoppers and crusher as per standards P8. Stabilize the crusher by raising & lowering the legs and tighten the all bolts P9. Fix all safety guards and devices
CU3. Prepare the crusher for operation	<i>You must be able to:</i> P1. Fit clips & pins to secure the feed hopper



	<p>P2. Place mast into working position</p> <p>P3. Place dust suppression bucket</p> <p>P4. Install bracing across the feed conveyor</p>
CU4. Set parameters on control panel	<p>You must be able to:</p> <p>P1. Configure the plant</p> <p>P2. View the engine information</p> <p>P3. Carryout machine settings</p> <p>P4. Set fuel levels</p> <p>P5. Set track operations</p>
CU5. Test run of engine	<p>You must be able to:</p> <p>P1. Turn battery isolation switch to on position</p> <p>P2. Turn ignition key to the first run position</p> <p>P3. Press emergency stop reset button, flashing for few seconds and alarm will start</p> <p>P4. Turn the ignition key to start position and release it slowly</p>
CU6. Perform test run on the plant	<p>You must be able to:</p> <p>P1. Perform pre-operative checks</p> <p>P2. Inspect Material buckets</p> <p>P3. Inspect electric and electronic circuits</p> <p>P4. Start the engine</p> <p>P5. Shutdown machine</p> <p>P6. Report malfunctions</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 the knowledge of:

- Plant drawings and its interpretation
- Production process and requirements
- Plant design in production process



- Plant Legs set up procedure
- Machine crushing modes
- Method of operations, Automatic mode & manual mode
- Daily calibration of crusher wears parts
- Feeding material into machine
- Feed conveyor metal detector

Critical Evidence(s) Required

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

- Interpret the installation manual
- Prepare crusher for operation
- Perform Test run on plant



041300860J -Competency Standard: Develop Entrepreneurial Skills

Overview: This Competency Standard identifies the competencies required to develop entrepreneurial skills, in accordance with the organization's approved guidelines and procedures. You will be expected to develop a business plan, collect information regarding funding sources, develop a marketing plan and develop basic business communication skills. Your underpinning knowledge regarding entrepreneurial skills will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Develop a business plan	You must be able to: P1. Conduct market survey to collect information P2. Select the best option in terms of cost, service, quality, sales, profit margin, overall expenses P3. Compile the information collected through the market survey, in the business plan format
CU2. Collect information regarding funding sources	You must be able to: P1. Identify the available funding sources based on their terms and conditions, maximum loan limit, payback time, interest rate P2. Choose the best available option according to investment requirement P3. Prepare documents according to the loan agreement requirement P4. Include the information of funding sources in the business plan
CU3. Develop a marketing plan	You must be able to: P1. Collect information required to devise marketing plan P2. Prepare marketing plan for new business
CU4. Develop basic business communication skills	You must be able to: P1. Communicate with internal customers and external customers P2. Use different modes of communication to communicate internally and externally e.g.: presentation, speaking, writing, listening, visual representation, reading etc.



	P3. Use specific business terms used in the market
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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:

- 7ps of marketing including product, price, placement, promotion, people, packaging and positioning
- 7Cs of business communication
- Different modes of communication and their application in the industry
- Business terms used in the industry
- Funding sources
- How to get loan to start a new business
- Market survey and its tools e.g.: questionnaire, interview, observation etc
- Market trends for specific product offering
- Elements of business plan
- How to fill the business plan format

Critical Evidence(s) Required

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

- Conduct market survey and formulate business plans in terms of feasibility, investment potential, risk, and completeness.
- Effectively present business ideas and profile



724CO11K- Competency Standard: Practice Professionalism

Overview:

This competency standard deal with learning the competencies needed to develop portfolio for industry. You can perform internship. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Develop Portfolio for industry	<i>You must be able to:</i> P1. Select previous assignments for portfolio P2. Work on previous selected assignments for portfolio P3. Compile variety of assignments for portfolio P4. Make Professional Portfolio for industry P5. Develop Digital Portfolio for industry
CU2. Perform Internship	<i>You must be able to:</i> P1. Prepare for internship <ul style="list-style-type: none">• Personal Presentation• Portfolio Presentation P2. Interview preparation P3. Demonstrate Ethics for Internship P4. Identify Industry for internship P5. Perform Internship in Industry <ul style="list-style-type: none">• Fill the Performa of Internship• Report the performance of internship



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:

- Importance of portfolio
- Ethics for Internship

Critical Evidence(s) Required

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

- Professional
- Portfolio



COMPLETE LIST OF TOOLS AND EQUIPMENT

Sr. #	Description
1.	Primavera P6 software
2.	Ball peen Hammer
3.	Board of Safety instructions
4.	Chisel
5.	Circuit Diagrams for Plants
6.	Computers
7.	Digital Balance
8.	Ear Plug
9.	Face mask
10.	Fire Buckets
11.	Fire Extinguishers
12.	First aid Kit
13.	Grip pliers
14.	Safety gloves
15.	Hand hacksaw with blade
16.	Hooks / Anchors
17.	Hoppers
18.	Internet router



Sr. #	Description
19.	Jackhammer
20.	Allen-key sets
21.	Log Books
22.	Manufacturers Operation and Maintenance Manual & Video
23.	Measuring Tape
24.	Micrometer
25.	Multimeter
26.	Nose pliers
27.	Plant software
28.	Combination Plier
29.	Printer
30.	Safety Apron
31.	Safety Belts
32.	Safety Blankets
33.	Safety goggles
34.	Safety harness
35.	Safety Helmets
36.	Safety net
37.	Safety Shoes



Sr. #	Description
38.	Scanner
39.	Screw driver set (Phillips and common)
40.	Shovels with handle
41.	Sieve set
42.	Simulated version of crushing plant operational software.
43.	Slings
44.	Slip joint plier
45.	Socket set (4mm to 14mm)
46.	Spatula
47.	Spirit Level
48.	Stationary Items
49.	Steel Rules
50.	Straight peen Hammer
51.	Stretcher
52.	Various hand / power tools
53.	Vernier Caliper
54.	Tweezers
55.	Basic electric and electronic components
56.	Steel drum



Sr. #	Description
57.	Set of screens
58.	Flakiness index gauge
59.	Elongated index gauge
60.	Gauging trowel
61.	Metallic tray
62.	Sieve shaking machine
63.	Compression testing machine
64.	Aggregate impact value test machine