

Curriculum

For

“Crush Plant Operator”

(Level -3)

25th to 29th October 2021



**National Vocational & Technical
Training Commission**

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Introduction

Definition/ Description of the training programme for Crush Plant Operator

There is an increasing demand of the crushing plant operator in construction industry. If an individual is planning to pursue a career in crush plant technology, this program will be helpful in targeting various industries including construction and mining.

Purpose of the training programme

The purpose of this training is to develop a range of skills and techniques, soft skills and attributes essential for successful performance in construction and mining sector in accordance with industry requirements. Diploma holders of this program may find employment in local and international industries.

Overall objectives of training programme

The main objective of this training program is to improve the employability of young diploma holders through qualifying job-related training in the construction and mining sector, and to train them so that they can prove to be an asset to this sector.

Competencies to be gained after completion of course

- Maintain Safety at Crushing Plant Site
- Work in a Team Environment
- Perform Computer Applications
- Manage Inventory of Raw Material for Production Process
- Operate Crushing Plant Software
- Prepare Crushing Plant for Production
- Perform Production on Plant

Possible available job opportunities available immediately and later in the future

- Crush Plant Operator
- Crush Plant Store Keeper

Trainee entry level

Middle or Equivalent (with English, Urdu, Numeracy, reading and writing skills)

Minimum qualification of trainer

Teaching staff should have Matriculation with at least five years' experience in Crushing Industry. Other formal certification in the Crushing Plant installation and operation from the manufacture or general Fitter would be useful in addition to the above.

OR

Teacher should have Level-4 / DAE in Mechanical / Mechanical with specialization in construction machinery with at least one years' experience in Crushing Industry. Other formal certification in the Crushing Plant installation and operation from the manufacture or general Fitter would be useful in addition to the above.

Recommended trainer: trainee ratio

The recommended maximum trainer: trainee ratio for this programme is 1 trainer for 25 trainees.

Medium of instruction i.e. language of instruction

Instruction will be Urdu and English.

Duration of the course (Total time, Theory & Practical time)

This curriculum comprises 7 modules. The recommended delivery time is 600 hours. Delivery of the course could therefore be full time, 5 days a week. Training providers are at liberty to develop other models of delivery, including part-time and evening delivery.

The full structure of the course is as follow:

No	Modules Title	Level	Theory		Practical		Total	
			C	Hr.	C	Hr.	C	Hr.
1.	Maintain Safety at Crushing Plant Site	3	1.7	17	6.3	63	8	80
2.	Work in a Team Environment	3	1.2	12	1.8	18	3	30
3.	Perform Computer Applications	3	1.1	11	3.9	39	5	50
4.	Manage Inventory of Raw Material for Production Process	3	1.9	19	8.1	81	10	100
5.	Operate Crushing Plant Software	3	1.2	12	4.8	48	6	60
6.	Prepare Crushing Plant for Production	3	2.7	27	12.3	123	15	150
7.	Perform Production on Plant	3	2.2	22	10.8	108	13	130
Total			12	120	48	480	60	600

Sequence of the Modules

Each module covers a range of learning components. These are intended to provide detailed guidance to teachers (for example the Learning Elements component) and give them additional support for preparing their lessons (for example the Materials Required component). The detail provided by each module will contribute to a standardized approach to teaching, ensuring that training providers in different parts of the country have clear information on what should be taught. Each module also incorporates the industrial needs of Pakistan.

The distribution table is shown below:

Module 1: Maintain Safety at Crushing Plant Site 80 Hours	Module 4: Manage Inventory of Raw Material for Production Process 100 Hours	Module 6: Prepare Crushing Plant for Production 150 Hours
Module 2: Work in a Team Environment 30 Hours	Module 5: Operate Crushing Plant Software 60Hours	Module 7: Perform Production on Plant 130 Hours
Module 3: Perform Computer Applications 50 Hours		

Summary – overview of the curriculum

Module Title and Aim	Learning Units	Theory hours	Workplace hours	Timeframe of modules
Module 1: Perform Production on Plant Aim: After successful completion of this module, the trainee is competent in Performing Production on Plant	LU1: Maintain safe work condition at site LU2: Perform fire fighting LU3: Carry out first aid treatment LU4: Perform Basic electrical work safely at workplace	17	63	80
Module 2: Work in a Team Environment Aim: After successful completion of this module, the trainee is competent in working in a team environment	LU1: Obtain and convey Workplace information LU2: Participate in workplace meetings and discussions LU3: Identify own role and responsibility within team LU4: Identify own role and responsibility within team	12	18	30

Module Title and Aim	Learning Units	Theory hours	Workplace hours	Timeframe of modules
Module 3: Perform Computer Applications Aim: After successful completion of this module, the trainee is competent in performing computer applications	LU1: Prepare Spreadsheet using MS Excel LU2: Prepare a presentation using MS Power Point	11	39	50
Module 4: Manage Inventory of Raw Material for Production Process Aim: After successful completion of this module, the trainee is competent in managing inventory of raw material for production process	LU1: Measure Raw material available in dump yard LU2: Perform the storage of finished materials LU3: Maintain the Log Register	19	81	100

Module Title and Aim	Learning Units	Theory hours	Workplace hours	Timeframe of modules
Module 5: Operate Crushing Plant Software Aim: After successful completion of this module, the trainee is competent in operating crushing plant software	LU1: Operate plant through software LU2: Operate PLC (crushing plant controller) for production	12	48	60
Module 6: Prepare Crushing Plant for Production Aim: After successful completion of this module, the trainee is competent in preparing crushing plant for production	LU1: Prepare production plan as per job order LU2: Perform pre-operative checks LU3: Perform routine calibration	27	123	150

Module Title and Aim	Learning Units	Theory hours	Workplace hours	Timeframe of modules
Module 7: Perform Production on Plant Aim: After successful completion of this module, the trainee is competent in performing production on plant	LU1: Perform preliminary operations LU2: Start Production LU3: Rectify malfunctioning during run LU4: Maintain the crushing record LU5: Perform shutdown activities	22	108	130

Modules

Module 1: Maintain Safety at Crushing Plant

Objective of the module: This competency standard covers the skills and knowledge required to maintain safe work condition at site, emergency response activity at crushing plant site. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Duration: 80 hours **Theory:** 17 hours **Practical:** 63 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1 Maintain safe work condition at site	The trainee will be able to: <ol style="list-style-type: none"> 1. Recognize the safety signs and symbols 2. Identify potential hazards at work site 3. Identify the risk of slip, trip and fall at work place 4. Perform fall protection measures as per job requirements 5. Label and store chemicals as per 	<ul style="list-style-type: none"> • Describe the safety signs at work place • Demonstrate the fall protection measures • Describe unsafe act and unsafe conditions • Knowledge of hazardous materials and relevant safety procedures Activity: <ul style="list-style-type: none"> • Visit the work site and identify the potential hazards and apply control measures • Practice to wear full body harness. • Sort and label hazardous chemicals at work site 	Total 26 hrs Theory: 5 hrs Practical: 21 hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Computer 	<ul style="list-style-type: none"> • Class Room • Simulated environment

	Material Safety Data Sheet (MSDS)				
LU 2 Perform fire fighting	The trainee will be able to: <ol style="list-style-type: none"> 1. Identify source of fire. 2. Identify classes of fire 3. Raise fire alarms 4. Select suitable fire extinguishers 5. Check expiry of fire extinguisher 6. Check wind direction 7. Locate emergency exits 8. Perform PASS (Pull, aim, squeeze and sweep) on fire extinguisher 	<ul style="list-style-type: none"> • Describe the fire triangle • State principles of fire fighting • Describe the source of fire • Explain classes of fire • Demonstrate firefighting techniques • Recognize different types of fire extinguisher Activity: <ul style="list-style-type: none"> • Perform mock exercise of fire fighting on a source of fire • Participate in emergency response drill 	Total 26 hrs Theory: 5 hrs Practical: 21 hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker Non Consumable <ul style="list-style-type: none"> • White board • Multimedia 	<ul style="list-style-type: none"> • Class Room • Simulated environment
LU 3 Carry out first aid treatment	The trainee will be able to: <ol style="list-style-type: none"> 1. Follow COVID-19 SOP's 2. Identify basic elements for first 	<ul style="list-style-type: none"> • Describe the ABC of first aid • Describe the first aid procedure for minor cut • Describe components of first aid 	Total 19 hrs Theory: 4 hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers 	<ul style="list-style-type: none"> • Class Room • Simulated environment

	aid kit 3. Maintain a fully stacked first aid kit 4. Check expiry date of medicines 5. Perform mock first aid treatment for minor injuries	kit Activity: Demonstrate mock exercise of first aid treatment for minor cut	Practical: 15 hrs	<ul style="list-style-type: none"> Sharpeners White board marker Non Consumable	
LU 4 Perform Basic electrical work safely at workplace	The trainee will be able to: <ol style="list-style-type: none"> Check the connectivity of earthing with power equipment Check leads and cable for any visual damage before use Tag damaged lead, cable and connection points and report to the supervisor 	<ul style="list-style-type: none"> Knowledge of electric hazards Describe protective measures against the electric hazards Activity: Practice to check and tag extension leads and cable for any visual damage	Total 9 hrs Theory: 3 hrs Practical: 6 hrs	Consumable <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpeners White board marker Non Consumable <ul style="list-style-type: none"> White board Multimedia Computer 	<ul style="list-style-type: none"> Class Room Simulated environment

Module 2: Work in a Team Environment

Objective of the module: The aim of this module to get knowledge, skills and understanding to work in a team environment.

Duration: 30 hours **Theory:** 12 hours **Practical:** 18 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Obtain and convey Workplace information	The trainee will be able to: <ol style="list-style-type: none"> 1. Assess the specific and relevant information from the appropriate sources 2. Convey the information using the appropriate medium and ideas 3. Use appropriate non-verbal communication 4. Identify appropriate lines of communication with supervisors and colleagues 5. Use the defined workplace procedures for storage of 	<ul style="list-style-type: none"> • Describe the importance of effective communication • State different Sources of information • State different mode of communication • Explain types of non-verbal communication • Explain mode of communication while operating machines • Explain the method of recording the information/instructions. • 	Total: 8hrs Theory: 5hrs Practical: 3hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Pen • White board marker Non-Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	<ul style="list-style-type: none"> • Class Room/Lab

	information 6. Inform co-workers and superiors about any deviation	Activity: <ul style="list-style-type: none"> • Role Play each trainee introduce himself. • Convey the job description and company general rules and regulations to fellow workers 			
LU2: Participate in workplace meetings and discussions	The trainee will be able to: <ol style="list-style-type: none"> 1. Express your own opinions 2. Listen other's point of view without interruption 3. Prepare simple questions about workplace procedures 	<ul style="list-style-type: none"> • Describe the protocol of meeting • Describe the role and objective of team. Activity: <ul style="list-style-type: none"> • Participate in mock meeting for preparation to perform job. 	Total: 7hrs Theory: 2hrs Practical: 5hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	<ul style="list-style-type: none"> • Class Room/Lab

LU3: Identify own role and responsibility within team	The trainee will be able to: <ol style="list-style-type: none"> 1. Identify the individual role and responsibilities within the team environment. 2. Recognize the roles and responsibility of other team members. 3. Report relationships within team and external to team 4. Share report with co-workers. 	<ul style="list-style-type: none"> • Describe the importance of creating cooperative work environment • Describe the role and objective of team. • Explain risk of failure team work on the project. • Describe the importance of resolving the co-worker's problems • State plan work and organize required resources in coordination with team <p>Activity:</p> <ul style="list-style-type: none"> • Role Play, get instruction regarding job order from supervisor and convey it to coworkers according 	Total: 7hrs Theory: 2hrs Practical: 5hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • White board marker 	<ul style="list-style-type: none"> • Class Room/Lab
LU4: Support the co-workers	The trainee will be able to: <ol style="list-style-type: none"> 1. Hand over the required materials and tools timely to interfacing team 	<ul style="list-style-type: none"> • Describe the importance of creating cooperative work environment • Describe the importance of resolving the co-worker's 	Total: 7hrs Theory: 2hrs Practical: 5hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers 	<ul style="list-style-type: none"> • Class Room/Lab

	<p>2. Work together with co-workers in an effective manner.</p> <p>3. Address the problems of co-worker effectively</p> <p>4. Report to immediate boss</p>	problems		<ul style="list-style-type: none"> Sharpeners <p>Non Consumable</p> <ul style="list-style-type: none"> White board Multimedia Internet <p>Computer system</p>	
		<p>Activity:</p> <ul style="list-style-type: none"> Role Play, Support and guide stressed co worker in his work related activity 			

Module 3: Perform Computer Applications

Objective of the module: The aim of this module to get knowledge, skills and understanding to perform computer applications

Duration: 50hours

Theory: 11hours

Practical: 39hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1:Prepare Spreadsheet using MS Excel	The trainee will be able to: <ol style="list-style-type: none"> 1. Create worksheet as per given data 2. Format the worksheet according to given criteria 3. Apply formulas according to the requirement 4. Generate Charts/Graphs according to the given data 5. Print Worksheet according to requirements 	<ul style="list-style-type: none"> • Explain different types of formulas in MS Excel • Describe short Keys MS Excel 	Total: 25hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Pen • White board marker Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • MS Office Software 	<ul style="list-style-type: none"> • Class Room / Computer Lab
		Activity: <ul style="list-style-type: none"> • Develop a practice to develop a work sheet as per given data • Format and apply a formula to a work sheet according to the requirement. • Practice to generate chart/graph according to given data. 	Theory: 5hrs Practical: 20hrs		

LU2: Prepare a presentation using MS Power Point	The trainee will be able to: <ol style="list-style-type: none"> 1. Insert slides with different layouts according to requirements of presentation. 2. Insert text, tables, images, etc. according to the requirement. 3. Apply a set of effects to animate the slide according to requirement. 4. Apply slide transitions on slides according to requirement. 5. Apply sound effects on objects/text/images according to requirement. 	<ul style="list-style-type: none"> • Explain types of presentation format • Describe short Keys of MS power point <hr/> Activity: <ul style="list-style-type: none"> • Practice of inserting slides different layout according to the requirement of presentation. • Practice of inserting text, tables, images into the slides. • Practice of applying effects, slide transition and sound effects according to requirement. 	Total: 20hrs Theory: 5hrs Practical: 15hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Printer • MS Office Software 	<ul style="list-style-type: none"> • Class Room / Computer Lab
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Module4: Manage Inventory of Material for Production Process

Objective of the module: The aim of this module to get knowledge, skills and understanding of managing inventory of material for production process

Duration:100

Theory: 19hours

Practical: 81 hours

hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1:Measure Raw material available in dump yard	The trainee will be able to: <ol style="list-style-type: none"> 1. Calculate amount of materials available on site 2. Cross check with the log register 3. Adjust demands in accordance with the available raw materials 4. Manage production plan accordingly 	<ul style="list-style-type: none"> • Explain types of Aggregates • Describe classification of aggregates according to nature of size and shape • Explain characteristics of graded fine and coarse aggregates • Describe principles of safe and efficient storage 	Total: 27 hrs Theory: 7hrs Practical: 20 hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Erasers • Sharpeners • White board marker • Material Log register 	Class Room/Plant Site
		Activity: <ul style="list-style-type: none"> • Practice of calculating the amount of material available on site. • Practice of adjusting demands in accordance with available raw material. 		Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	

LU2. Perform the storage of finished materials	The trainee will be able to: <ol style="list-style-type: none"> 1. Dump materials as per graded sizes 2. Check materials quality & quantity visually as per standard procedures 3. Maintain log book of materials In/Out 	<ul style="list-style-type: none"> • Describe moisture of aggregates • Knowledge about safety of aggregates against the weather and dust • Describe the importance of gradation of aggregates Activity: <ul style="list-style-type: none"> • Practice of dumping material as per graded sizes. • Practice of checking material quality and quantity as per standards. • Practice of maintaining log book of material 	Total: 36hrs Theory: 6hrs Practical: 30hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Erasers • Sharpeners • White board marker • Material Log register Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	<ul style="list-style-type: none"> • Class Room / Plant Site
LU3. Maintain the Log Register	<ol style="list-style-type: none"> 1. Manage Log Register on daily basis 2. Enter data corresponding to every type of raw material 3. Audit Log register with available materials at site 4. Report to in-charge in case of any issues 5. Prepare production / dispatch 	<ul style="list-style-type: none"> • Knowledge about the safety of aggregates against the weather and dust • Explain the importance of gradation of aggregates • Define flaky and elongated aggregates • Describe site material characteristics 	Total: 37 hrs Theory: 6 hrs Practical: 31hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Erasers • Sharpeners • White board marker • Material Log register 	Class Room / Plant Site

	record sheet			Non Consumable	
		Activity: <ul style="list-style-type: none"> • Practice of maintaining log register on daily bases. • Practice of cross checking available material with log register. • Practice of generating report in case of any deficiency. 		<ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	

Module 5: Operate Crushing Plant Software

Objective of the module: The aim of this module to get knowledge, skills and understanding of operating of crushing plant software

Duration: 60 hours

Theory: 12 hours

Practical: 48 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Operate plant through software	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Turn the ignition switch 2. Check and adjust the rpm of engine 3. Adjust the position of conveyer belts 4. Check hydraulic temperature 5. Start product conveyors 6. Start crusher 7. Start dirt conveyors 8. Adjust speed of feeder 9. Trial and error with rotor speed and apron setting until get the product as per work order, and Start Production 10. Finish Production 11. Empty the feeder and dirt 	<ul style="list-style-type: none"> • Describe the importance of software usage for plant operations • Explain the procedures of input data (recipe/job order, vehicle etc.) in software • Knowledge about data management process and its importance • Describe the importance of keeping production data record <p>Activity:</p> <ul style="list-style-type: none"> • Practice to input recipe in software according to the production order. 	<p>Total: 30 Hrs</p> <p>Theory: 6 hrs</p> <p>Practical: 24 Hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Whiteboard marker <p>Non Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Software 	<ul style="list-style-type: none"> • Class Room / Plant Site

	conveyors 12. Stop crusher, product conveyors and engine respectively				
LU2: Operate PLC (crushing plant controller) for production	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Set programme value for different crushing and quantity in PLC 2. Set system parameters to control equipment 3. Control auto and manual operation of plant through PLC 4. Identify error and reset the display for safe operations 5. Calibrate and parameterisation error 	<ul style="list-style-type: none"> • Explain the types of PLC • Understanding the usage of different types of PLC for production process • Knowledge about error codes of PLC and their meanings • Describe techniques of handling PLC <p>Activity:</p> <ul style="list-style-type: none"> • Practice to input recipe in PLC according to the production order. 	<p>Total: 30 Hrs</p> <p>Theory: 6 hrs</p> <p>Practical: 24 Hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker <p>Non Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • PLC 	<ul style="list-style-type: none"> • Class Room / Plant Site

Module 6: Prepare Crushing Plant for Production

Objective of the module: The aim of this module to get knowledge, skills and understanding to prepare crushing plant for production

Duration: 150hours

Theory: 27hours

Practical: 123 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Prepare production plan as per job order	The trainee will be able to: <ol style="list-style-type: none"> 1. Interpret production plan given by plant in-charge 2. Identify the type of product required, time to run and raw/reclaim materials required 3. Check availability of raw material as per production plan 4. Check availability of transportation machinery (Dumper & loader, etc.) 5. Generate demand for material and machinery 	<ul style="list-style-type: none"> • Understanding of plant layout drawings and its interpretation • Knowledge about production process and requirements • Describe the importance of plant design in production process • Explain the principles of operation of the equipment to be maintained 	Total: 50 hrs Theory: 9hrs Practical: 41 hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Whiteboard marker Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	<ul style="list-style-type: none"> • Class Room / Crush Plant Site
		Activity: <ul style="list-style-type: none"> • Practice of preparing a production plan according to job order. 			

LU2: Perform pre-operative checks	The trainee will be able to: <ol style="list-style-type: none"> 1. Inspect oil, water and filter of compressor and generator 2. Maintain the oil level in all gear boxes, hydraulic unit as per the procedures set by the manufacturer 3. Inspect tension on all v-drive belts 4. Inspect conveyor belt for alignment and excessive wear 5. Grease, lubricate and tighten bearings and gate pivot points 6. Check emptiness of crush plant 7. Inspect adequacy of voltage/frequency (for single and three phase) supply PLC according to machinery requirement 	<ul style="list-style-type: none"> • Explain the function and troubleshooting of major internal components and their problems • Describe appropriate testing procedures and use of equipment for a range of faults • Describe the maintenance planning/scheduling/records systems • Explain physical measurement, alignment and clearance principles. • Explain testing procedures • State the importance of production schedules and its designing • Explain maintenance of machinery / plant 	Total: 50 hrs Theory: 9 hrs Practical: 41 hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Grease • Lubricant • White board marker <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Multi meter • Tool kit 	<ul style="list-style-type: none"> • Class Room / Crush Plant Site
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	<p>8. Check damaged wiring, loose electrical fitting, sensor and switches</p> <p>9. Check tightness of all hydraulic and pneumatic connections and the condition of flexible tubes and rubber seals</p> <p>10. Operate manually valves and gates of plant</p> <p>11. Inspect that all equipment is set and adjusted according to production schedule as required</p> <p>12. Report maintenance requirements</p> <p>13. Test run of crush plant</p>	<p>Activity:</p> <ul style="list-style-type: none"> Practice of performing pre-operative checks before production. 		<ul style="list-style-type: none"> Grease gun Lubricating cane 	
LU3: Perform routine calibration	<p>The trainee will be able to:</p> <p>1. Check RPM sensor of conveyor belt for accurate values</p> <p>2. Perform trial loading for calibration</p>	<p>1. Describe calibration techniques</p> <p>2. Describe underlying causes of faults such as precipitated by:</p> <ul style="list-style-type: none"> ✓ Product loading and unloading ✓ Materials ✓ Equipment ✓ Functions of Mechanical Systems of crushing plant ✓ Inspection & Maintenance of crushing plant, and its 	<p>Total:50 hrs</p> <p>Theory: 9 hrs</p> <p>Practical: 41 hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpeners sensors <p>Non Consumable</p> <ul style="list-style-type: none"> White board 	<ul style="list-style-type: none"> Class Room / Crush Plant Site

		<p>associated Attachments.</p> <ul style="list-style-type: none"> ✓ Inspection & Maintenance procedure of Mechanical Systems in crushing plant ✓ Types of crush plant ✓ Types of crushers ✓ Components of crushers ✓ Components of conveyor belt ✓ Types of screen ✓ Types of Hopper ✓ Components of control panel ✓ Components of feeder ✓ Components Electrical system ✓ Types of feeders ✓ Components of hydraulic system and pneumatic system 		<ul style="list-style-type: none"> • Multimedia • Internet • Computer system • Multi meter 	
		<p>Activity:</p> <ul style="list-style-type: none"> • Practice of performing routine calibration of load sensor and RPM sensor. 			

Module 7: Perform Production on Plant

Objective of the module: The aim of this module to get knowledge, skills and understanding to perform production on plant.

Duration: 130hours

Theory: 22 hours

Practical: 108hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1:Perform preliminary operations	The trainee will be able to: <ol style="list-style-type: none"> 1. ON the ignition switch 2. Enter and adjust Input data as per work order 3. Set parameter of plant operations 	<ul style="list-style-type: none"> • Explain working principle of crushing Plant (Automatic and Manual) type • Describe the features, performance and output of the crushing plant. • . Activity: <ul style="list-style-type: none"> • Practice of entering and adjusting input data & setting parameters. 	Total: 24 hrs Theory: 4 hrs Practical: 20 hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Log Book • Summary Sheet • Cleaning rag • Wire brush • White board marker Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	<ul style="list-style-type: none"> • Class Room / Crush Plant Site

LU2:Start Production	The trainee will be able to: <ol style="list-style-type: none"> 1. Select quantity in cubic meter for Aggregates 2. Select screens 3. Run 1st trial of aggregate 4. Conduct the sieve test 5. Make adjustments as per work order specifications of aggregates 6. Modify the recipe as per work order given by supervisor 7. Prepare sample at site as per standard procedures and sampling rules. 	<ul style="list-style-type: none"> • Explain starting procedure, basic operations and monitoring systems. • Describe stopping procedure including emergency stop button. • Explain post operation procedure for crushing plant • Knowledge about the Identification and correct usage of basic communication, hand signals, safety & emergency signs at project site Activity: <ul style="list-style-type: none"> • Practice to perform test run. 	Total: 24 hrs Theory: 5hrs Practical: 19 hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Log Book • Summary Sheet • Cleaning rag • Wire brush • White board marker Non-Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	<ul style="list-style-type: none"> • Class Room / Crush Plant Site
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LU3: Rectify malfunctioning during run	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Diagnose the software indicated fault 2. Switch plant from automatic to manual operations 3. Discharge the in-process load before rectification of fault 4. Rectify fault before next operation in accordance with procedures 	<ul style="list-style-type: none"> • Describe typical causes of equipment failures and the service conditions which may increase maintenance • Knowledge about types and nature of maintenance (preventative, periodic, corrective) uses, benefits and limitations Understanding of factors that may affect product quality or production output and appropriate remedies. <p>Activity:</p> <ul style="list-style-type: none"> • Practice the rectification of malfunctioning during diagnoses by the software. 	<p>Total: 29 hrs</p> <p>Theory: 5hrs</p> <p>Practical:24 hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Log Book • Summary Sheet • Cleaning rag • Wire brush • White board marker <p>Non-Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	<ul style="list-style-type: none"> • Class Room / Crush Plant Site
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LU4: Maintain the crushing record	The trainee will be able to: <ul style="list-style-type: none"> • Prepare the Raw Materials Consumption summary sheet • Prepare crush plant production summary sheet. • Keep crushing record (input and output flow) 	<ul style="list-style-type: none"> • Knowledge to prepare the summary sheet of raw material. • Describe types and nature of maintenance (preventative, periodic, corrective) uses, benefits and limitations 	Total: 29 hrs Theory: 4 hrs Practical: 25 hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Log Book • Summary Sheet • Cleaning rag • Wire brush • White board 	<ul style="list-style-type: none"> • Class Room / Crush Plant Site
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	on plant log book.	Activity: <ul style="list-style-type: none"> Practice of preparing summary sheet of consumed raw material. Practice of maintaining crushing record and log book according to job order 		marker Non-Consumable <ul style="list-style-type: none"> White board Multimedia Internet Computer system 	
LU5: Perform shutdown activities	The trainee will be able to: <ol style="list-style-type: none"> Empty the feeder, conveyors and crusher Clean the conveyor that 	<ul style="list-style-type: none"> Explain stopping procedure including emergency stop button. Understanding about post operative check list 	Total: 24 hrs Theory: 4 hrs	Consumable <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpeners 	<ul style="list-style-type: none"> Class Room / Crush Plant Site

	<p>discharges the aggregates into the storage area</p> <ol style="list-style-type: none"> 3. Run the empty crusher for 5-10 minutes. 4. Stop the feeder, dirt conveyor belt, crusher and product conveyor respectively and then shutdown the system. 5. Inspect for damages/ leaks etc. and report / take appropriate action 6. Greasing all required parts manually. 	<div data-bbox="763 496 1339 687"> <p>Activity:</p> <ul style="list-style-type: none"> Practice to perform shut down activity, post-operative checks and cleaning. </div>	<p>Practical: 20 hrs</p>	<ul style="list-style-type: none"> Log Book Summary Sheet Cleaning rag Wire brush White board marker <p>Non-Consumable</p> <ul style="list-style-type: none"> White board Multimedia Internet Computer system 	
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General assessment guidance for *Crush Plant Operator*

Good practice in Pakistan makes use of sessional and final assessments, the basis of which is described below. Good practice by vocational training providers in Pakistan is to use a combination of these sessional and final assessments, combined to produce the final qualification result.

Sessional assessment is going on all the time. Its purpose is to provide feedback on what students are learning:

- To the student: to identify achievement and areas for further work
- To the teacher: to evaluate the effectiveness of teaching to date, and to focus future plans.

Assessors need to devise sessional assessments for both theoretical and practical work. Guidance is provided in the assessment strategy

Final assessment is the assessment, usually on completion of a course or module, which says whether or not the student has "passed". It is – or should be – undertaken with reference to all the objectives or outcomes of the course, and is usually fairly formal. Considerations of security – ensuring that the student who gets the credit is the person who did the work – assume considerable importance in final assessment.

Methods of assessment

For lessons with a high quantity of theory, written or oral tests related to learning outcomes and/ or learning content can be conducted. For workplace lessons, assessment can focus on the quality of planning the related process, the quality of executing the process, the quality of the product and/or evaluation of the process.

Methods include direct assessment, which is the most desirable form of assessment. For this method, evidence is obtained by direct observation of the student's performance.

Examples for direct assessment of a crushing plant operator include:

- Work performances, for example work in a team environment, maintain safety at crushing plant site and perform computer applications.
- Demonstrations, for example preparing crushing plant for production
- Direct questioning, where the assessor would ask the student how to maintain safety at crushing plant site, how they can work in a team environment , how they can perform production on plant and how they can manage inventory of raw material for production process
- Paper-based tests, such as multiple choice or short answer questions on work in a team environment and operate crushing plant software

- Indirect assessment is the method used where the performance could not be watched and evidence is gained indirectly.

Examples for indirect assessment of a Crushing Plant Operator include:

- Work products, such as managing inventory of raw material for production process

Indirect assessment should only be a second choice. (In some cases, it may not even be guaranteed that the work products were produced by the person being assessed.)

Principles of assessment

All assessments should be valid, reliable, fair and flexible:

Fairness means that there should be no advantages or disadvantages for any assessed person. For example, it should not happen that one student gets prior information about the type of work performance that will be assessed, while another candidate does not get any prior information.

Validity means that a valid assessment assesses what it claims to assess. For example, if operate crushing plant software is to be assessed and certificated, the assessment should involve performance criteria that are directly related to that activity. An interview about the operating crushing plant software would not meet the performance criteria.

Reliability means that the assessment is consistent and reproducible. For example, if the work performance of preparing documents in words has been assessed, another assessor (e.g. the future employer) should be able to see the same work performance and witness the same level of achievement.

Flexibility means that the assessor has to be flexible concerning the assessment approach. For example, if there is a power failure during the assessment, the assessor should modify the arrangements to accommodate the students' needs.

Assessment strategy for “Crush Plant Operator”

This curriculum consists of 7 modules:

- **Module 1:** Maintain Safety at Crushing Plant Site
- **Module 2:** Work in a Team Environment
- **Module 3:** Perform Computer Applications
- **Module 4:** Manage Inventory of Raw Material for Production Process
- **Module 5:** Operate Crushing Plant Software
- **Module 6:** Prepare Crushing Plant for Production
- **Module 7:** Perform Production on Plant

Sessional assessment

The sessional assessment for all modules shall be in two parts: theoretical assessment and practical assessment. The sessional marks shall contribute to the final qualification.

Theoretical assessment for all learning modules must consist of a written paper lasting at least one hour per module. This can be a combination of multiple choice and short answer questions.

For practical assessment, all procedures and methods for the modules must be assessed on a sessional basis. Guidance is provided below under Planning for assessment.

Final assessment

Final assessment shall be in two parts: theoretical assessment and practical assessment. The final assessment marks shall contribute to the final qualification.

The assessment team

The number of assessors must meet the needs of the students and the training provider. For example, where two assessors are conducting the assessment, there must be a maximum of five students per assessor. In this example, a group of 25 students shall therefore require assessments to be carried out over a four-day period. For a group of only 10 to 15 students, assessments would be carried out over a two-day period only.

Planning for assessment

Sessional assessment: assessors need to plan in advance how they will conduct sessional assessments for each module. The tables on the following pages are for assessors to use to insert how many hours of theoretical and practical assessment will be conducted and what the scheduled dates are.

Final assessment: Training providers need to decide ways to combine modules into a cohesive two-day final assessment programme for each group of five students. Training providers must agree the content for practical assessments in advance.

Complete list of tools and equipment

Sr #	Description	Quantity
1.	Computer Systems	26
2.	Scanner	1
3.	Printer	1
4.	Hardness Testers	1
5.	Universal testing machine(UTM)	1
6.	Impact Testing Machines	1
7.	Steel Rulers	10
8.	Tri Square	10
9.	Inside Vernier Caliper	10
10.	Odd leg Vernier Caliper	10
11.	Trammel Vernier Caliper	10
12.	Outside Vernier Caliper	10
13.	Vernier Depth gauge	5
14.	Vernier Bevel protractor	5
15.	Thread gauges	5
16.	Screw pitch gauges	5
17.	Fillet gauges	5

18.	Feeler gauges	5
19.	Vernier Height gauge	5
20.	Dial indicators with magnetic stand	5
21.	Vernier Micrometer	5
22.	Inside Micrometer	5
23.	Outside Micrometer	10
24.	Depth Micrometer	5
25.	Snap Gauge set	2
26.	Dial Bore Gauge	5
27.	Set of Adjustable Wrench	5
28.	Set of Spanners (Open end, Ring)	5 each
29.	Pipe wrench	2
30.	L-key sets	5
31.	Nose pliers	5
32.	Grip pliers	5
33.	Wrenches	5
34.	Pliers	5
35.	Screw driver (Positive and negative)	5
36.	Hammer	5
37.	Vice grip	5
38.	Grease gun	5 each

39.	Paint brush	10
40.	Steel brush	25
41.	Measuring tape	10
42.	Hopper	10
43.	Conveyor	10
44.	Torque gauge	5
45.	Steel rule	5
46.	Multi-meter	5
47.	Thermometers	5
48.	Spanner set	10 packs
49.	Socket set	1
50.	Star Kit	1
51.	ST(special service Tool)	1
52.	Drilling Machines	1
53.	Location Determining Devices	1
54.	Digging slant determining devices	1
55.	Communication Devices	10
56.	Sample Boxes	10
57.	Exploration and Scanning Devices	2
58.	Drawing board	25
59.	Lathe Machine	05

60.	Welding Plant	05
61.	Crush Plant	01
62.	Wheel Loader	02
63.	Dumper	02

List of Consumable Supplies

Sr no	Material	Quantity
1.	Note book	25
2.	Pencil	25
3.	White sheets	25
4.	Eraser	25
5.	Sharpener	25
6.	Pen	25
7.	Aggregate	In Cub cm
8.	Inventory sheet	10
9.	Inventor register	5
10.	Cleaning brush	25
11.	Cotton rags	1KG
12.	PPE's	25
13.	Lubricants	In Litters

14.	Sampling Bag	25
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Credit values

The credit value of the National Certificate Level 3 in Crushing Plant Operator is defined by estimating the amount of time/ instruction hours required to complete each competency unit and competency standard. The NVQF uses a standard credit value of 1 credit = 10 hours of learning (Following Higher Education Commission (HEC) guidelines).

The credit values are as follows:

No	Modules	Estimate of Hours		Credit
1.	Maintain Safety at Crushing Plant Site	80		8
2.	Work in a Team Environment	30		3
3.	Perform Computer Applications	50		5
4.	Manage Inventory of Raw Material for Production Process	100		10
5.	Operate Crushing Plant Software	60		6
6.	Prepare Crushing Plant for Production	150		15
7.	Perform Production on Plant	130		13