



National Competency Standards for
“Digging Operation Supervisor”
“Assistant Operational Supervisor”
Level-4



National Vocational and Technical Training Commission
(NAVTTTC) Government of Pakistan



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INTRODUCTION

Digging Operation/Excavation is one of the booming industries of Pakistan. There is an increasing demand of Assistant Digger Operator. Therefore, the skills are required to be inducted in the future generation. If an individual is planning to pursue a career in construction, this program will be helpful in targeting various industries including mechanical, electrical, automobile, hydraulics, etc. If an individual is planning to take up Assistant Digger Operator, this course will help him/her weigh their choices better.

Keeping in view of the above the competency based national vocational qualifications have been developed by NAVTTTC 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 construction industry. This will improve the quality in different industrial sectors by



Assistant Digger Operator 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 Assistant Digger Operator
- 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 Assistant Digger Operator in Pakistan

DATE OF VALIDATION

This national vocational qualification (NVQ) has been validated by the Qualifications Development Committee (QDC) in 08th to 12th November, 2021 and will remain in currency until 20th Jan 2023/2024.

*Shall be reviewed after 3 years



CODE OF QUALIFICATION

Qualification Title	Code
National Vocational Certificate Level 4, in (Digging Operation Supervisor) "Assistant Operational Supervisor"	724DOT06

ENTRY REQUIREMENTS

- For National Vocational Certificate Level-4 in "Technician" (Digging Operation Supervisor), the entry requirement is award of National Vocational Certificate Level-3 in "Digging Operation Supervisor".



QUALIFICATIONS DEVELOPMENT COMMITTEE

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

Sr. No.	Name	Designation	Organization
1.	Shahzad Ahmad	Director	SS&-C, NAVTTTC HQ
2.	Mehwish Aisha Ahsan	DACUM Facilitator	CBT Expert/Certified Assessor
3.	Muhammad Faraz Haider	Instructor, Mechanical	CTTI Islamabad
4.	Sikander Mehmood	Instructor, Mechanical	CTTI Islamabad
5.	Muhammad Rizwan Sarwar	Sr Instructor	GTTI Sheikhpura)
6.	Saif Ullah Khan	AD, Technical	PITAC, Lahore
7.	Sajid Mahmood	Site Incharge	National Construction Co, Lahore
8.	Engr. Abdul Basit Mansoor	AFM Civil	PITAC, Lahore
9.	Engr. Muhammad Ibrar	Manager Site,	DHA Bahawalpur
10.	Engr. Ameer Khusro	Site Supervisor,	Makson, Peshawar
11.	Engr. Rebab Maria Mehmood	Site Engineer	IMC Engineering & Consultants, Lahore
12.	Engr. Norheen Amina	Project Coordinator	Allied Engineering Services, Lahore
13.	Tahir Mahmood	GTTI Mughalpura	Lahore
14.	Dr Amjad Hussain	AP, Mechanical	UET, Lahore
15.	Dr Shahid Imran	HOD	Mechanical, UET, Lahore



QUALIFICATIONS REVIEW AND VALIDATION COMMITTEE

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

Sr. No.	Name	Designation	Organization
1.	Shahzad Ahmad	Director	SS&-C, NAVTTTC HQ
2.	Mehwish Aisha Ahsan	DACUM Facilitator	CBT Expert/Certified Assessor
3.	Aqsa Saleem	CBT Assessor	GCU, Faisalabad
4.	Mr Shahzad Zafar	Master Trainer/Ex DD	PTEVTA, Lahore
5.	Muhammad Younas	Master Trainer/Ex DD	Staff training College Lahore
6.	Engr. Muhammad Ibrar	Manager Site	DHA Bahawalpur
7.	Engr. Jamal Akbar	Associate Professor, Mechanical Department	GCT Peshawar
8.	Engr. Tashiq Semab Amin	Dy Manager,	HIT Taxila
9.	Mr. Tahir Shah	Assistant Secretary	TTB Peshawar
10.	Engr. Usama Ahmed	Assistant Track Engineer	Orange Line, Lahore
11.	Engr. Nohman Ahmad	Great Drilling Co	Iraq
12.	Syeda Fatima Iqbal	System Analyst	PBTE
13.	Israr Ahmed	Secretary	BTE, KPK
14.	Syed Mansoor Ahmed	Assistant Manager IT, NVQF Registry Incharge	SBTE Sindh
15.	Humaira Kanwal	Assistant Professor	University of Lahore, Lahore



SUMMARY OF COMPETENCY STANDARDS

National Vocational Certificate Level 4, in (Digging Operation Supervisor) “Assistant Operational Supervisor” (12 Months)								
Code	Competency Standards	Level	Theory		Practical		Total	
			C	Hr.	C	Hr.	C	Hr.
1.	A-Establish and maintain the occupational Health and safety system	4	1	10	2	20	3	30
2.	B-Perform Advance communication	4	1	10	2	20	3	30
3.	C-Analyse Workplace Policies and Procedures	4	1	10	2	20	3	30
4.	D-Maintain Electrical System of Equipment	4	2	20	10	100	12	120
5.	E-Maintain Mechanical System of Equipment	4	3	30	13	130	16	160
6.	F-Maintain Hydraulic System of Equipment	4	2	20	12	120	14	140
7.	G-Develop Preliminary Project Plan	4	4	40	21	210	25	250
8.	H- Perform Advance Digging/Excavation Operations	4	5	50	27	270	32	320
9.	I-Perform 2D – 3D Engineering Drawings using CAD Software	4	2	20	10	100	12	120
Grand Total			21	210	99	990	120	1200



Competency Standard A: 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. This unit applies to workers who have either a legislated or delegated responsibility to implement OHS systems to meet the organization's policy requirements. These roles require significant role or delegated authority to allow effective implementation and review. While designed for public safety workers, this unit could be applied in a range of industries. This unit does not cover the broader implementation of organisation wide OHS policy.

Competency Units	Performance Criteria
CU1. Organise consultation process	<p>You must be able to:</p> <p>P1. Identify and invite relevant personnel or other representative personnel into the development and maintenance processes.</p> <p>P2. Handle issues raised through consultation according to issue resolution procedures.</p> <p>P3. Verify results from the consultation process and makes it available to relevant personnel.</p>
CU2. Design Occupational Health and Safety framework	<p>You must be able to:</p> <p>P1. Identify hazards and risks correctly and confirm according to occupational health and safety legislation, codes of practice and prevailing trends.</p> <p>P2. Develop procedure for ongoing identification of hazards and risks and integrated within work systems and procedures</p> <p>P3. Develop occupational health and safety policies line with relevant legislation.</p> <p>P4. Incorporate and define occupational health and safety responsibilities and duties into job descriptions/statements.</p> <p>P5. Provide adequate resources in a timely and consistent manner.</p>



	<p>P6. Develop and implement measures to control assessed risks in accordance with the hierarchy of control, relevant occupational health and safety legislation, codes of practice and trends.</p> <p>P7. Implement interim solutions until a permanent control measure.</p> <p>P8. Record details clearly and efficiently according to organisation policy and procedures and relevant legislation</p>
<p>CU3. Design and implement an Occupational Health and Safety awareness training program</p>	<p>You must be able to:</p> <p>P1. Devise educational information on the occupational health and safety system and make it available to all relevant personnel.</p> <p>P2. Provide appropriate training to all relevant personnel to enable the implementation of safety procedures</p>
<p>CU4. Establish, monitor and maintain Occupational Health and safety system</p>	<p>You must be able to:</p> <p>P1. Establish a system for keeping occupational health and safety records in accordance with legislative requirements.</p> <p>P2. Monitor Work activities to ensure that hazard identification and risk assessment and control procedures are effectively adopted.</p> <p>P3. Identify Inadequacies in hazard, risk assessment and established risk control measures in accordance with the hierarchy of control and report to designated personnel.</p> <p>P4. Amendments to procedures are undertaken through appropriate consultation methods</p>
<p>CU5. Establish and maintain a system for accident investigation</p>	<p>You must be able to:</p> <p>P1. Develop a system and implement for reporting and investigation of all accidents/incidents in accordance with the policies and procedures.</p> <p>P2. Provide training to employees responsible for accident investigation for effective implementation of accident investigation policy.</p>



	P3. Implement Policies and procedures for reporting and investigating all accidents/incidents are reviewed and updated as required
CU6. Evaluate the organization's Occupational Health and Safety system and related policies procedures and programs	<p>You must be able to:</p> <p>P1. Ensure the effectiveness of the occupational health and safety system and related policies, procedures and programs is assessed according to the organization's occupational health and safety policy.</p> <p>P2. Develop occupational health and safety system and implement it.</p> <p>P3. Compliance with occupational health and safety legislation and codes of practice is assessed to ensure that legal occupational health and safety standards are maintained</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:

- State details of all relevant Occupational Health and Safety legislation and its relevance to organisation operations
- State details of codes of practice and their relevance to organisation operations
- Explain 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)
- Describe literacy levels and communication skills of work group members
- State knowledge of current principles and practices used to implement and monitor organizational OH&S policies
- Explain procedures and programs



- Elaborate suitable communication techniques to address needs of work group members

Critical Evidence(s) Required

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

A person who demonstrates competency in this unit must be able to provide evidence of the ability to establish and maintain the occupational health and safety system. 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.

Performance requirements

This competency is to be assessed using standard and authorized work practices, safety requirements and environmental constraints. Demonstrated evidence is required of the ability to:

1. Demonstrated understanding of principles and practices for Occupational Health and Safety.
2. Demonstrated understanding of the significance of other management systems and procedures for occupational health and safety.



Competency Standard B: Perform Advance Communication - 001100853

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 Units	Performance Criteria
CU1. Demonstrate professional skills	<p><i>You must be able to:</i></p> <p>P1. Use different modes of communication to communicate</p> <ul style="list-style-type: none"> • Speaking • Reading • Writing • Listening • Presentation • visual representation etc <p>P2. Develop CV Skills according requirements</p> <p>P3. Upgrade professional skills by attending trainings, webinars, conferences etc.</p> <p>P4. Perform Continuous professional development as required at workplace</p> <p>P5. Develop interview skills</p>
CU2. Plan and Organize work	<p><i>You must be able to:</i></p> <p>P1. Identify task requirements.</p> <p>P2. Plan steps to complete tasks.</p> <p>P3. Review planning and organizing process.</p> <p>P4. Organize work.</p>
CU3. Provide trainings at workplace	<p><i>You must be able to:</i></p> <p>P1. Assess the need for training</p> <p>P2. Prepare trainees for the learning experience</p> <p>P3. Present training session</p> <p>P4. Support trainees in managing their own learning</p>



	<p>P5. Facilitate group learning</p> <p>P6. Provide opportunity for practice</p> <p>P7. Provide feedback on progress on trainees</p> <p>P8. Review delivery experience</p>
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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:

- Explaining the training skills
- Identification of the professional skills
- Describing the advanced language skills
- Understanding of the assessment and trainees feedback methods
- Direct and indirect communication methods
- Explaining the need of the training type at the work place

Critical Evidence(s) Required

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

1. Job sheet
2. Office emails and coordination reports
3. Feedback Performa



Competency Standard C: Analyse with Workplace Policy and Procedures - 041700841

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 Units	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>



	P3. Seek feedback from employees, clients and colleagues to develop and improve competence
CU5. Follow and implement work safety requirements	<p>You must be able to:</p> <p>P1. Identify and report emergency incidents</p> <p>P2. Practice organizational policy and procedures for responding to emergency incidents</p> <p>P3. Identify and implement workplace procedures and work instructions for controlling risks</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:

- 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.

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



Competency Standard D: Maintain Electrical System of Equipment - 724DOT06A

Overview: This competency standard deal with learning the competencies needed to perform electric discharge machining (EDM) sinker operations. That includes preparing a machine before performing EDM machining process. It will also allow you to carryout EDM process and inspect job as per drawing. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Maintain Starting System	<p><i>You must be able to:</i></p> <p>P1. Check Battery and maintain Voltage according to set standards</p> <p>P2. Maintain Current according to set standards</p> <p>P3. Check and maintain Self Starting Motor using appropriate instruments and tools</p> <p>P4. Check and maintain pre-heater of engine</p>
CU2. Maintain Charging System	<p><i>You must be able to:</i></p> <p>P1. Perform health check of electrical cables</p> <p>P2. Maintain Battery Voltage according to set standards</p> <p>P3. Check Battery Relays using appropriate instruments and tools</p> <p>P4. Maintain Battery Voltage using appropriate tool</p> <p>P5. Perform test bench of the alternator</p> <p>P6. Replace/repair alternator</p>
CU3. Maintain Electrical Power System	<p><i>You must be able to:</i></p> <p>P1. Maintain operation of indicators, lights, etc.</p> <p>P2. Maintain working of wiping system</p> <p>P3. Maintain working of sensors</p> <p>P4. Replace faulty fuse</p> <p>P5. Maintain solenoid</p>
CU4. Maintain Wiring of Equipment	<p><i>You must be able to:</i></p> <p>P1. Interpret schematic wiring diagram from equipment</p>



	manual P2. Check battery Resistance using appropriate instruments and tools P3. Check and maintain continuity of wiring
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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:

- schematic wiring diagram
- Maintenance tools and instruments and their usage (Multimeter)
- Starting System of equipment
- Charging System of equipment
- Lighting System of equipment
- Wiring System
- Sensors, solenoid and fuses

Critical Evidence(s) Required

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

1. Portfolio
2. Identify faults in Charging system
3. Maintain wiring
4. Check and maintain working of sensor



Competency Standard E: Maintain Mechanical System of Equipment - 724DOT06B

Overview: This competency standard deal with learning the competencies needed to perform electric discharge machining (EDM) sinker operations. That includes preparing a machine before performing EDM machining process. It will also allow you to carryout EDM process and inspect job as per drawing. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Maintain Intake and exhaust System	<p><i>You must be able to:</i></p> <p>P1. Maintain Air Filters</p> <p>P2. Maintain Intake Manifold for any leakage</p> <p>P3. Maintain Tappet</p> <p>P4. Maintain Turbo Charger</p> <p>P5. Maintain Exhaust Gas Recirculation Valve (EGR)</p> <p>P6. Measure Vacuum Pressure</p> <p>P7. Measure Compression Pressure</p> <p>P8. Maintain Inter Cooler and After Cooler</p>
CU2. Maintain cooling System	<p><i>You must be able to:</i></p> <p>P1. Replace faulty Engine Belts</p> <p>P2. Inspect and maintain Radiator</p> <p>P3. Inspect and maintain Hoses (Upper and lower)</p> <p>P4. Inspect and replace Thermostat Valve</p> <p>P5. Inspect and maintain condition of Ethylene Glycol in the cooling system using Refractometer</p> <p>P6. Maintain Water Pump</p>
CU3. Maintain fuel system	<p><i>You must be able to:</i></p> <p>P1. Maintain Fuel Pump</p> <p>P2. Maintain Fuel Filter</p> <p>P3. Maintain Water Separator</p>



	P4. Maintain Fuel Injector
CU4. Maintain Lubrication System	<i>You must be able to:</i> P1. Change Lubrication oil and oil filter P2. Check leakage and take preventive measures P3. Maintain Lubrication Pump P4. Maintain Relief Valve P5. Maintain Sensors

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:

- Intake and exhaust system
- Cooling System
- Fuel System
- Lubrication System
- Properties of Ethylene Glycol
- Types of filters
- Types of pumps
- Diesel Engines

Critical Evidence(s) Required

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

1. Maintain Cooling System according to the SOPs
2. Check leakage of fuel system and take preventive measures



Competency Standard F: Maintain Hydraulic System of Equipment - 724DOT06C

Overview: This competency standard deal with learning the competencies needed to Maintain Hydraulic System of Equipment. That includes Maintaining Swing System, Work equipment system, Travel System and maintaining Open Load Sensing System (OLSS. Your underpinning knowledge will be sufficient to provide the basis for your work.

Competency Units	Performance Criteria
CU1. Maintain Swing System	<p><i>You must be able to:</i></p> <p>P1. Perform the maintenance of Hydraulic Tank</p> <p>P2. Perform the maintenance of Hydraulic Filter</p> <p>P3. Perform the maintenance of Hydraulic Pump</p> <p>P4. Perform the maintenance of Control Valves</p> <p>P5. Perform the maintenance of Hydraulic Motor</p> <p>P6. Perform the maintenance of Hydraulic Pipes</p> <p>P7. Change Swing machinery oil</p>
CU2. Maintain Work equipment system	<p><i>You must be able to:</i></p> <p>P1. Perform the maintenance of Hydraulic Tank</p> <p>P2. Perform the maintenance of Hydraulic Filter</p> <p>P3. Perform the maintenance of Hydraulic Pump</p> <p>P4. Perform the maintenance of Control Valves</p> <p>P5. Perform the maintenance of Hydraulic Cylinders (Boom, bucket, arm, etc.)</p> <p>P6. Perform the maintenance of Hydraulic Pipes</p>
CU3. Maintain Travel System	<p><i>You must be able to:</i></p> <p>P1. Perform the maintenance of Hydraulic Tank</p> <p>P2. Perform the maintenance of Hydraulic Filter</p> <p>P3. Perform the maintenance of Hydraulic Pump</p> <p>P4. Perform the maintenance of Control Valves</p> <p>P5. Perform the maintenance of Hydraulic Travel Motors</p>



	P6. Perform the maintenance of Hydraulic Pipes P7. Change Final drive oil
CU4. Maintain Open Load Sensing System (OLSS)	<i>You must be able to:</i> P1. Perform the maintenance of TVC Valve P2. Perform the maintenance of CO Valve P3. Perform the maintenance of NC Valve P4. Perform the maintenance of Servo Valve P5. Perform the maintenance of Servo Piston

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:

- Hydraulic Circuit
- Pressure Control Valves
- Direction Control Valves
- Flow Control Valves
- Properties of Hydraulic Oil
- Types of pumps
- Hydraulic Motors
- Hydraulic Cylinders
- Measuring instruments and their usage
- TVC (Torque Variable Control) Valve
- CO (Cut Off) Valve
- NC (Negative Control) Valve
- Servo Valve
- Servo Piston
- Procedure to maintain Hydraulic System
- Pascal Law

Critical Evidence(s) Required



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

1. Inspect and maintain Hydraulic Travel Motors
2. Inspect and maintain Hydraulic Cylinders (Boom, bucket, arm, etc.)
3. Inspect and change Swing machinery oil



Competency Standard G: Develop a Preliminary Project Plan - 724DOT06D

Overview: This competency standard deal with learning the competencies needed to develop Preliminary Project Plan. That includes preparing flow chart for tendering process, preparing tender documents, tender notice and collecting proposals. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Perform Survey of Area	<p>You must be able to:</p> <p>P1. Perform reconnaissance survey of area for project</p> <p>P2. Perform topographic survey of area for project</p> <p>P3. Prepare map of area for project</p>
CU2. Prepare Estimate	<p>You must be able to:</p> <p>P1. Prepare rough cost and detail estimation</p> <p>P2. Estimate the quantity</p> <p>P3. Estimate the unit cost</p> <p>P4. Calculate the total cost</p> <p>P5. Mark options on the prepared map</p> <p>P6. Get Administrative approval of cost and estimation</p>
CU3. Prepare the plan of project features	<p>You must be able to:</p> <p>P1. Prepare the project plan as per requirement</p> <p>P2. Perform Survey as per the requirement</p> <p>P3. Prepare working drawings of project</p>
CU4. Prepare feasibility report	<p>You must be able to:</p> <p>P1. Identify construction and system feasibility- resources for project</p> <p>P2. Identify social benefits from the project-operations</p> <p>P3. Estimate quantity of work, time, and available resources for project</p> <p>P4. Prepare feasibility report of project</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:

- Importance of preliminary planning
- Pre-feasibility study
- Types of feasibility study
- Steps involved in feasibility study
- Difference between feasibility report and project report
- Data to be collected and aspects to be considered in feasibility report
- Aspects to be considered during preparation of project report

Critical Evidence(s) Required

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

1. Prepare feasibility report of project



Competency Standard H: Perform Advance Digging/Excavation Operations - 724DOT06E

Overview: This competency standard deal with learning the competencies needed to perform Digging/Excavation Operation. That includes preparatory activities, performing Digging and post digging activities. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Prepare Trenches	<p>You must be able to:</p> <p>P1. Perform preparatory activities</p> <p>P2. Fit appropriate attachment to the equipment according to the job requirement</p> <p>P3. Set the work equipment according to the job requirement</p> <p>P4. Perform excavation to prepare Trench as per requirement</p> <p>P5. Monitor equipment performance</p> <p>P6. Coordinate activities with site team</p> <p>P7. Perform post digging/ Excavation activities</p> <p>P8. Submit the job completion report to the concern person</p>
CU2. Perform Geometrical Shapes Excavation	<p>You must be able to:</p> <p>P1. Perform preparatory activities</p> <p>P2. Fit appropriate attachment to the equipment according to the job requirement</p> <p>P3. Set the work equipment according to the job requirement</p> <p>P4. Perform excavation to prepare Geometrical shapes as per requirement</p> <p>P5. Monitor equipment performance</p> <p>P6. Coordinate activities with site team</p> <p>P7. Perform post digging/ Excavation activities</p> <p>P8. Submit the job completion report to the concern person</p>



CU3. Perform different types of excavations	<i>You must be able to:</i> P1. Perform preparatory activities P2. Fit appropriate attachment to the equipment according to the job requirement P3. Set the work equipment according to the job requirement P4. Perform Cut & Fill (Stripping) excavation P5. Perform Barrow excavation P6. Perform Channel excavation P7. Perform Top Soil excavation P8. Perform Bridge excavation P9. Perform Drainage excavation P10. Perform Rock excavation P11. Perform Muck excavation P12. Perform post digging/ Excavation activities P13. Coordinate activities with site team P14. Perform post digging/ Excavation activities P15. Submit the job completion report to the concern person
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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:

- Technical drawings
- Classification of excavation
- Different types of attachment used on excavator
- Benchmarking
- Sequence of operations to achieve the job requirements
- PPE's

Critical Evidence(s) Required

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



competency standard:



1. Prepare a trench according to the given instructions



Competency Standard F: Perform 2D – 3D Engineering Drawings using CAD Software - 724DOT06F

Overview: This competency standard deal with learning the competencies needed to create 2D and 3D drawings by using various tools and commands in computer. You can create and modify objects and drawings in CAD software to meet specific intentions according to job requirements. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Draw 2D shapes	<p>You must be able to:</p> <p>P1. Setup user interface settings for required drawing.</p> <p>P2. Create different 2D shapes with given measurements.</p> <p>P3. Edit different 2D shapes to meet requirement.</p> <p>P4. Insert dimensions and symbols as per requirement</p> <p>P5. Save the file in different drawing formats</p>
CU2. Prepare final sets of 2D drawings	<p>You must be able to:</p> <p>P1. Develop 2D Drawing with given project specification and measurements.</p> <p>P2. Plot drawing on scale according to required size & orientation.</p>
CU3. Develop 3D Objects	<p>You must be able to:</p> <p>P1. Setup 3D user interface settings for required drawing.</p> <p>P2. Create different 3D objects with given measurements.</p>
CU4. Manipulate 3D objects using 3D Editing Tools	<p>You must be able to:</p> <p>P1. Modify 3D objects in line with the requirements.</p> <p>P2. Make customized 3D models according to the requirement of given job.</p> <p>P3. Generate orthographic views from 3D model</p> <p>P4. Generate sectional/auxiliary views from 3D model as per requirement</p>



CU5. Render 3D Model	You must be able to: P1. Apply material to required 3D Model as per given specification P2. Render and print the 3D model according to required size & orientation. P3. Apply material texture to 3D model as per requirement.
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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:

- 2CAD drawings
- Dimensioning techniques and drawing symbols
- 3D modelling in AutoCAD
 - 3D solids
 - surfaces
 - meshes
 - Wireframe objects
 - Difference between Surface Modelling and Solid Modelling.
- Boolean operation on 3D solid model
 - Subtraction
 - Intersection
 - Union
- 3D Navigate control
 - Pre-set views such as isometric, top, bottom, front, left, etc.
 - Perspective projection and parallel projection
 - Constrained Orbit
- Material and light control
- Insert Standard parts from CAD library

Critical Evidence(s) Required



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

1. Portfolio
2. 2D Drawings with given project specification and measurements.
3. Make customized 3D models and generate different 2D/3D views on layout according to the requirement of given job.



COMPLETE LIST OF TOOLS AND EQUIPMENT

SR#	Tools & Equipment	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.	Crawler Excavator	5
34.	Wheel Excavator	5
35.	Wrenches	5
36.	Pliers	5
37.	Screw driver (Positive and negative)	5
38.	Hammer	5
39.	Vice grip	5
40.	Grease gun	5 each
41.	Paint brush	10
42.	Steel brush	25
43.	Crawler Excavator	10



44.	Measuring tape	10
45.	High pressure washer	5
46.	Air compressor	5
47.	Rigid and articulated dump truck (Off road)	5
48.	Dump truck (On road)	10 set
49.	Hopper	10
50.	Conveyor	10
51.	Vernier caliper (out, inside)	5
52.	Torque gauge	5
53.	Steel rule	5
54.	Multi-meter	5
55.	Thermometers	5
56.	Spanner set	10 packs
57.	Socket set	1
58.	ST(special service Tool)	1
59.	Drilling Machines	1
60.	Location Determining Devices	1
61.	Digging slant determining devices	1
62.	Communication Devices	10
63.	Sample Boxes	10
64.	Exploration and Scanning Devices	2
65.	Drawing board	25
PPEs		



66.	Helmet	25
67.	Safety shoes	25
68.	Safety belt	25
69.	Cotton hand gloves	25
70.	Goggles	25
71.	Reflective jackets	25
72.	Safety Signs & Message boards	25
73.	Full body Harness	25
74.	Lanyard	25
75.	Anchorage	25
76.	Barricade tape	25
77.	Metal barricades	25
78.	Plastic cones	25
79.	Safety nets.	25
MATERIALS/LUBRICANTS		
80.	Engine oil	
81.	Gear oil	
82.	Hydraulic oil	
83.	Coolant	
84.	Grease	
85.	Nitrogen gas	
86.	Marking cloth	
87.	Spare parts	



88.	Machine parts	
89.	Boulders	
90.	Soil	
91.	Sand	
92.	Limestone	
93.	Debris	
94.	Coal	
95.	Landfill	
96.	Ore	
97.	Silt	