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HEAVY MACHINE OPERATOR

TRAINER GUIDE

National Vocational Certificate Level 1

Version 1 - November, 2019

NAVTTC

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Contents

Introduction

Competence-based training helps to bridge the gap between what is taught in training and what tasks will be performed on the job. Training trainees to perform actual job functions helps to ensure that future front-line workers have the skills, knowledge and abilities required to perform their jobs properly, safely and effectively. In addition to competence-based training, assessment based on the performance of actual work competencies helps to ensure that:

- Trainees are performing their work tasks as safely as possible
- Performance gaps are recognized prior to serious incidents
- Training can be implemented to improve competence.

There are significant benefits to competence-based training:

- ## Cost Effectiveness

  Since training activities and assessments in a competence-based approach are goal-oriented, trainers focus on clearly defined areas of skills, knowledge and understanding that their own industry has defined in the competence standards. At the same time, trainees are more motivated to learn when they realize the benefits of improved performance.

- ## Efficiency

  The transfer gap between the training environment and working on the job is reduced substantially in a competence-based approach. This is because training and assessment are relevant to what needs to be done on the job. As a result, it takes less time for trainees to become competent in the required areas. This, in turn, contributes to improved efficiency where training and assessment are concerned.

- ## Increased Productivity

  When trainees become competent in the competence standards that their own industry has defined, when they know what the performance expectations are and receive recognition for their abilities through successful assessments, they are likely to be more motivated and experience higher job satisfaction. The result is improved productivity for organizations. The communication and constructive feedback between future employers and employees will improve as a result of a competence-based approach, which can also increase productivity.

- ## Reduced Risk

  Using a competence-based approach to training, development, and assessment, employers are able to create project teams of people with complementary skills. A trainee's record of the skills, knowledge and understanding relating to the competence standards they have achieved can be used by a future employer to identify and provide further relevant training and assessment for new skills areas. Competence standards can shape employee development and promotional paths within an organization and give employees the opportunity to learn more competencies beyond their roles. It can also provide organizations with greater ability to scale and flex as needed, thereby reducing the risk they face.

- **Increased Customer Satisfaction**

  Employees who have been trained and assessed using a competence-based approach are, by the definition of the relevant competence standards, able to perform the required tasks associated with a job. The knock-on effect is that, in service-related industries, they are able to provide high service levels, thereby increasing customer satisfaction. In production or manufacturing industries, they are able to work closely to industry standards in a more effective and efficient way.

Lesson plans

This manual provides a series of lesson plans that will guide delivery of each module for the *Heavy Machinery Operator* qualification. It is important for trainers to be flexible and be ready to adapt lesson plans to suit the context of the subject and the needs of their trainees.

Good teachers acknowledge that CBT means each and every trainee in the class learns at a different speed. The good teacher is prepared to throw aside the day's lesson plan and do something different (and unplanned) for the class even if it means 'writing' a lesson plan for each trainee to match their learning pace for that day or week.

Learning by doing is different from learning theory and then applying it. To learn to do something, trainees need someone looking over their shoulder saying 'it's not quite like that, it's like this', 'you do it like this because …', or even 'tell me why you chose to do it like this?'.

In this way, trainees learn that theoretical knowledge is meaningless if it is not seen in the context of what they are doing. In other words, if a trainee doesn't know why they do something, they will not do it competently (skills underpinned by knowledge = competent performer).

This is how a *Heavy Machinery Operator* acquires a practical grasp of the standards expected. It's not by learning it in theory, but because those standards are acquired through correction by people who show what the standards are, and correct the trainee where they do not meet those standards, and where they repeat it correction until they have internalized those standards.

Demonstration of Skill

Demonstration or modeling a skill is a powerful tool, which is used, in vocational training. The instructions for trainers for demonstration are as under:

a) Read the procedure mentioned in the Trainer Guide for the relevant Learning Unit before demonstration.
b) Arrange all tools, equipment and consumable material, which are required for demonstration of a skill.
c) Practice the skill before demonstration to trainees, if possible.
d) Introduce the skill to trainees clearly at the commencement of demonstration.
e) Explain how the skill relates to the skill(s) already acquired and describe the expected results or show the objects to trainees.
f) Carry out demonstration in a way that can be seen by all trainees.
g) Use the same tools and materials that the learner will be using.
h) Go through EACH of the steps involved in performing the skill.
i) Go SLOWLY - describe each step as it is completed.
j) Encourage the learners to move around and watch what you are doing from a number of different angles.

k) Identify critical or complex steps, or steps that involve safety precautions to be followed.
l) Explain theoretical knowledge where applicable and ask questions to trainees to test their understanding.
m) Try to involve the learners: Ask them questions about why they think the process may work that way.
n) Repeat critical steps in demonstration, if required.
o) Summarize the demonstration by asking questions to trainees.

Involvement in the process (actively seeing) is important at this stage. When you work on getting involved, getting people to participate, you make them a part of what is happening. Questions for clarification or explanation are important throughout the demonstration. It is up to the learners to ask questions about things they do not understand, but it is also important for trainers to seek out and elicit questions from learners. A trainer may need to do repeated demonstrations of difficult or complex skills.

Overview of the program

Course: Level 1 Heavy Machinery Operator	**Total Course Duration:** 210 Hours

Course Overview:

In order to build the capacity of technical and vocational training institutes in Pakistan through provision of demand driven competencies based trainings in construction sector the NAVTTC, and TEVT Sector Support Program (TSSP) have joined hands together to develop training courses for construction sector. These trainings will not only build the capacity of existing workers of this sector but also support the youth to acquire skills best fit for this sector. The benefits and impact of development of these training courses will be on both demand and supply side.

Based upon this demand of industry these competency-based trainings for Heavy Machine Operator are developed under National Vocational Qualification Framework (NVQF) (Level 1 to 4). The training courses mainly cover competencies along with related knowledge and professional skills which are essential for getting a job or self-employed.

The training courses are also in line with the vision of Pakistan's National Skills Strategy (NSS), National TVET Policy and NVQF. This provides policy directions, support and an enabling environment to the public and private sectors to impart training for skills development to enhance social and economic profile.

The purpose of the training is to provide skilled manpower to improve the existing capacity of construction sector. This training will provide the requisite skills to the trainees to operate Heavy Machines. It will enable the participants to meet the challenges in the field of construction industry. Further, to improve the skill level of the Operators and prepare them for the construction industry to meet the market competition nationally and internationally. The core purpose of this qualification is to produce employable Heavy Machine Operators who could operate Heavy Machines according to national and international standards. In addition, this qualification will prepare unemployable youth to employ in construction sector.

1. Overview of the Curriculum for Heavy Machine Operator:

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of Modules
Module A: **Comply with Work Health and Safety Policies** **Aim:** After completing this module, the learner will be able to know skills and knowledge required to apply general work health and safety requirements in the workplace. Communicate work and health safety assess at work place. It describes generic work health and safety responsibilities applicable to employees without managerial or supervisory responsibilities.	**LU-1:** Work safely at work place **LU-2:** Communicate work health and safety (WHS) assess at work place **LU-3:** Minimize risks to personal safety at work place **LU-4:** Minimize risks to public safety	**06**	**24**	**30**
Module B: **Obey the Workplace Policies and Procedures** **Aim:** After completing this module, the learner will be able to obey the workplace personal appearance and hygiene, follow work ethics, Demonstrate the workplace behavior, Communicate the workplace policy and procedure and review the implementation of workplace policy and procedures.	**LU-1:** Obey the workplace personal appearance and hygiene **LU-2:** Follow work ethics **LU-3:** Demonstrate the work place behaviours **LU-4:** Communicate workplace policy & procedures **LU-5:** Review the implementation of workplace policy & procedures	**04**	**16**	**20**

Module C: **Follow Basic Communication Skills (General)** **Aim:** After completing this module, the learner will be able to listen attentively, develop non-verbal communication, and identify communication barriers, interview preparation for job and different communication platforms in the workplace and throughout your career	**LU-1:** Adopt effective listening to skills **LU-2:** Develop nonverbal communication with peers **LU-3:** Prepare for Interview to get a job **LU-4:** Use communication platform at workplace **LU-5:** Identify communication barriers to improve interpersonal skills	**10**	**40**	**50**
Module D: **Operate Computer Functions (General).** **Aim:** After completing this module, the learner will be able to have skills and knowledge required to setup a computer system, organize files in folders, and shutdown a computer system.	**LU1.** Set up the computer for use **LU2.** Organize files in folder **LU3.** Shut down computer system	**10**	**40**	**50**
Module E: **Identify Machines and Its attachments** **Aim:** This competency standard covers the skills and knowledge required to Identify Machine and its sizes, identify components & attachments, identify capacities & capabilities of machine, identify basic tools and supplies associated with machine and manage inventory of tools and equipment.	**LU-1:** Identify machine and its sizes. **LU-2:** Identify components & attachments **LU-3:** Identify capacities & capabilities of machine **LU-4:** Identify basic tools and supplies associated with machines **LU-5:** Maintain inventory of tools and equipment.	**16**	**44**	**60**
	TOTAL	**46**	**164**	**210**

LESSON PLAN MODULE E

Module E:

Identify Machine & its Attachments.

Learning Unit

LU-1: Identify Machine and its sizes.

LU-2: Identify components & Attachments

LU-3: Identify capacities & capabilities of Machine

LU-4: Identify basic tools and supplies associated with Machines

LU-5: Manage Inventory of tools and equipment.

Learning Outcomes

Trainee will be able to understand the different types of heavy machines like Bull Dozer, Excavator, Wheel Loader and Motor Grader. The components, attachments, capacities and capabilities of the machine. Trainees will be able to identify and understand the tools and supplies available with the machine and will get knowledge of how to manage and record the inventory and stock of tools and equipment professionally.

Methods:	Key Notes:	Media:	Time:
Through Multimedia Presentations and Physical demonstration of machines	What is Heavy Machinery Use of Heavy Machinery, its sizes Identification of components, attachments, tools and supplies of heavy machinery Identification of capacity and capability of Machines and Manage and record inventory of the tools and equipment	Physical Machines, Chalk for marking on machine, tools for opening and showing different components of machine	60 hours

Introduction

What is Heavy Machinery, Use of Heavy Machinery, its sizes, Identification of components, attachments, tools and supplies of heavy machinery

Identification of capacity and capability of Machines and

Manage and record inventory of the tools and equipment

Main Body

- Explain Machines, its usage, capacities, capabilities, components like Hydraulic filter, air filter, oil filter, hose pipes, seals, greasing points, basic supplies like fuel, engine oil, hydraulic oil and its types, inside the driver cabin, sensitve components, controls and instrument panels, levers, their functions, & the

various Attachments of Machines..	
Conclusion	
The trainees will be able to Identify Machine and its sizes. Identify components & Attachments**.** Identify capacities & capabilities of Machine. Identify basic tools and supplies associated with Machines. Manage Inventory of tools and equipment.	
Assessment Ask questions about previous lesson and sk learners to distinguish between different tools and machines.	
	Total time: 60 Hrs.

Trainer's guidelines

Module E: Identify Machine & its Attachments			
Learning Unit	**Suggested Teaching / Learning Activities**	**Delivery Context**	**Media**
LU1: Identify Machine and its sizes.	Begin the session through an illustrative presentation. Ensure that the presentation addresses the following points, including demonstrations of equipment and methods where appropriate: • Explain wheel loader, bull dozer, excavator and graders Machines and their usage • Explain in detail the top manufacturers and models of machines commonly used • Show trainees the model number and specification plates on the machines physically • Explain how to read model number and manufacturer's name on the machine physically • Explain how to identify machine's manufacturing year through model number • Explain how to determine the size of the machine through model number • Explain the standard symbols used for identifying the size of the machine • Explain the importance of size determination of machine in a construction work. **Arrange a questions and answers session to clarify trainee understanding.** **Ask the trainees to identify different models of the machines physically by reading tags on the machines body** **Ask the trainees to identify different sizes of the machines physically by reading model number**	Class Room & On site	• Machine Manuals • Machines • Machine Attachments • Multimedia

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Module-E

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Module E: Identify Machine & its Attachments

Learning Unit	Suggested Teaching / Learning Activities	Delivery Context	Media
LU2: Identify components & Attachments	Begin the session through an illustrative presentation. Ensure that the presentation addresses the following points, including demonstrations of equipment and methods where appropriate: • Explain and idnetify common components like Hydraulic system, air filter, oil filter, hose pipes, seals, greasing points, chain tracks, undercarriage, load bearing components of machines. • Identify the fuel tank, engine oil tank, hydraulic oil tank and their capacities • Explain the difference between primary components and secondary components • Identify the primary working components of bull dozer, wheel loader, excavator and grader like blade, bucket, teeth etc • Identify the secondary working components of bull dozer, wheel loader, excavator and grader like ground ripper, etc • Explain and identify components inside the driver cabin, sensitve components, controls, instrument panels, levers, joy sticks and their functions • Explain the functions of levers and sticks of bull dozer, wheel loader, excavtor and grader • Explain the function of instrument panel of grader • Explain the various Attachments of Bull Dozer, Wheel Loader, Excavator and Grader **Arrange a questions and answers session to clarify trainee understanding.** 1. Perfrom physicall inspection and identification of each component in front of learners **Ask the trainees to identify different components of the machines physically** **Ask the trainees to identify the functions of levers and sticks of excavator and wheel loader**	Class Room & On site	• Machine Manuals • Machines • Machine Attachments • Multimedia

Module E: Identify Machine & its Attachments

Learning Unit	Suggested Teaching / Learning Activities	Delivery Context	Media
	Trainees need to practice their skills in using basic methods and tools		
LU3: Identify capacities & capabilities of Machine	Begin the session through an illustrative presentation. Ensure that the presentation addresses the following points, including demonstrations of equipment and methods where appropriate: • Explain the load bearing capacities of wheel loader with respect to its different model numbers & catalogue • Explain the capability of wheel loader with respect to its different model numbers & catalogue • Explain the grinding and ripping capacities of bull dozer with respect to its different model numbers & catalogue • Explain the capability of bull dozer with respect to its different model numbers & catalogue • Explain excavation capacity of Excavator with respect to its different model numbers & catalogue • Explain the capability of Excavator with respect to its different model numbers & catalogue • Explain the grading capacities of grader with respect to its different model numbers & catalogue • Explain the capability of Grader with respect to its different model numbers & catalogue **Arrange a questions and answers session to clarify trainee understanding.** 1. Present through manufacturers catalogue the capacities and capabilities of various models of Bull Dozer 2. Present through manufacturers catalogue the capacities and capabilities of various models of wheel loader 3. Present through model number the capacities and capabilities of various models of Excavator	Class Room & On site	Manufacturer's Catalogue Available machines on site

Module E: Identify Machine & its Attachments

Learning Unit	Suggested Teaching / Learning Activities	Delivery Context	Media
	4. Present through model number the capacities and capabilities of various models of Grader **Ask the trainees to identify the capacity and capability of excavator and wheel loader through manufacturers catalogue** **Ask the trainees to identify the capacity and capability of Bull Dozer and Grader through model number.** **Trainees need to practice their skills in using basic methods and tools**		
LU4: Identify basic tools and supplies associated with Machines	Begin the session through an illustrative presentation. Ensure that the presentation addresses the following points, including demonstrations of equipment and methods where appropriate: • Describe the function of supplies like hydraulic oil, engine oil in machine working • Describe the minimum level to be maintained of the supplies for smooth functioning for bull dozer, wheel loader, excavator and Grader • Explain basic supplies like fuel, engine oil, hydraulic oil and its types for machines • Describe the standard supplies and tools for bull dozer as per manufacturers specifications • Describe the standard supplies and tools for bull wheel loader as per manufacturers specifications • Describe the standard supplies and tools for Excavator as per manufacturers specifications • Describe the standard supplies and tools for Grader as per manufacturers specifications • Show the packing and seal of gallons of new supplies	Class Room & On site	Manufacturer's Catalogue Available machines on site Hydraulic oil kan Engine oil kan Tool kit

Module E: Identify Machine & its Attachments

Learning Unit	Suggested Teaching / Learning Activities	Delivery Context	Media
	• Show the standard tool kit and packing/casing of new tool kit and condition of tools • Explain how to identify used tools and broken seal of supplies by visual inspection **Arrange a questions and answers session to clarify trainee understanding.** **Ask the trainees to list down the minimum level of supplies to be maintained for Bull Dozer, Wheel Loader, Excavator and Grader** **Ask trainees to distinguish between new and old seals of hydraulic oil kan**		
LU5: Manage Inventory of tools and equipment.	Begin the session Through an illustrative presentation. Ensure that the presentation addresses the following points, including demonstrations of equipment and methods where appropriate: • Explain how to identify the standard tool kit and tools supplied with machine through manufacturer's standard machine manual • Explain SOP for recording of tools and equipment inventory • Explain what is log book and its importance • Explain standard process for recording inventory on log book • Explain basic inventory management like LIFO & FIFO **Arrange a questions and answers session to clarify trainee understanding.** 1. Perform a demo of inventory record of tools in the log book 2. Perform a demo of making inventory in the log book. 3. Ensure the trainees understand and practice to be able to manage inventory of tools and equipment.	Class room	• Tool record register • Periodic inspection record register • Log book • Inventory Management Sop's

Multiple Choice Questions (MCQ's)

Question	**1**	Which machine you should use for ripping soil	Xx	A Bull Dozer
				B Wheel Loader
				C Excavator
				D Grader
Question	**2**	Why is it important to know the capacity of machines		A To ensure that the Machine is suitable for working
				B To be able to work more quickly and without any hazard
			xx	C To prevent any hazard or damage to machine due to overload
				D To demonstrate good working skills
Question	**3**	Why is it important to choose best lubricants		A To avoid risking the money waste
			Xx	B To prevent machinery from breaking down
				C To avoid low quality working
				D To ensure that the sound of the machine is fine
Question	**4**	Which TWO of the following are causes of machinery break down?		A Un even working areas

Xx	B	Wrong selection of machine as per the capacity and capability of machine
	C	Water seepage in Machine blade
Xx	D	Use of Low-quality supplies and lubricants

Question 5 What is the importance of maintaining a log book?

	A	Prevent expensive repair works from happening
	B	Helps you create specialized maintenance programs
	C	Prevent problems regarding warranty claims
	D	It increases the safety of operators
Xx	E	All of the above

Frequently Asked Questions (FAQs)

1. What is Competency Based Training (CBT) and how is it different from currently offered trainings in institutes?	Competency-based training (CBT) is an approach to vocational education and training that places emphasis on what a person can do in the workplace as a result of completing a program of training. Compared to conventional programs, the competency based training is not primarily content based; it rather focuses on the competence requirement of the envisaged job role. The whole qualification refers to certain industry standard criterion and is modularized in nature rather than being course oriented.
2. What is the passing criterion for CBT certificate?	You shall be required to be declared “Competent” in the summative assessment to attain the certificate.
3. What are the entry requirements for this course?	The entry requirement for this course is 8th Grade or equivalent.
4. How can I progress in my educational career after attaining this certificate?	You shall be eligible to take admission in the National Vocational Certificate Level-3 in Leather Products Development Technician (Pattern Maker). You shall be able to progress further to National Vocational Certificate Level-4 in Heavy Construction Machinery Operator Course; and take admission in a level-5, DAE or equivalent course (if applicable). In certain case, you may be required to attain an equivalence certificate from The Inter Board Committee of Chairmen (IBCC).
5. If I have the experience and skills mentioned in the competency standards, do I still need to attend the course to attain this certificate?	You can opt to take part in the Recognition of Prior Learning (RPL) program by contacting the relevant training institute and getting assessed by providing the required evidences.
6. What is the entry requirement for Recognition of Prior Learning program (RPL)?	There is no general entry requirement. The institute shall assess you, identify your competence gaps and offer you courses to cover the gaps; after which you can take up the final assessment.
7. Is there any age restriction for entry in this course or Recognition of Prior Learning program (RPL)?	There are no age restrictions to enter this course or take up the Recognition of Prior Learning program
8. What is the duration of this course?	The duration of the course work is 1,510 hrs. (11 months)

9. What are the class timings?	The classes are normally offered 25 days a month from 08:00am to 01:30pm. These may vary according to the practices of certain institutes.
10. What is equivalence of this certificate with other qualifications?	As per the national vocational qualification's framework, the level-4 certificate is equivalent to Matriculation. The equivalence certificate can be obtained from The Inter Board Committee of Chairmen (IBCC).
11. What is the importance of this certificate in National and International job market?	This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTTC). These standards are also recognized worldwide as all the standards are coded using international methodology and are accessible to the employers worldwide through NAVTTC website.
12. Which jobs can I get after attaining this certificate? Are there job for this certificate in public sector as well?	You shall be able to take up jobs in the local or overseas construction companies in heavy machinery operator job profile.
13. What are possible career progressions in industry after attaining this certificate?	You shall be able to progress up to the level of supervisor after attaining sufficient experience, knowledge and skills during the job. Attaining additional relevant qualifications may aid your career advancement to even higher levels.
14. Is this certificate recognized by any competent authority in Pakistan?	This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTTC). The official certificates shall be awarded by the relevant certificate awarding body.
15. Is on-the-job training mandatory for this certificate? If yes, what is the duration of on-the-job training?	On-the-job training is not a requirement for final / summative assessment of this certificate. However, taking up on-the-job training after or during the course work may add your chances to get a job afterwards.
16. How much salary can I get on job after attaining this certificate?	The minimum wages announced by the Government of Pakistan in 2019 are PKR 17,500. This may vary in subsequent years and different regions of the country. Progressive employers may pay more than the mentioned amount. The heavy Machinery Operator normally earns 20,000 to 25,000 in the start.
17. Are there any alternative certificates which I can take up?	There are some short courses offered by some training institutes on this subject. Some institutes may still be offering conventional certificate courses in the field.
18. What is the teaching language of this course?	The leaching language of this course is Urdu and English.

19. Is it possible to switch to other certificate programs during the course?	There are some short courses offered by some training institutes on this subject. Some institutes may still be offering conventional certificate courses in the field.
20. What is the examination / assessment system in this program?	Competency based assessments are organized by training institutes during the course which serve the purpose of assessing the progress and preparedness of each student. Final / summative assessments are organized by the relevant qualification awarding bodies at the end of the certificate program. You shall be required to be declared “Competent” in the summative assessment to attain the certificate.
21. Does this certificate enable me to work as freelancer?	You can start your small business by purchasing your own heavy construction machine and can start earning 50,000 per month. You may need additional skills on entrepreneurship to support your initiative.

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