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ELECTRICAL MACHINE WINDING TECHNICIAN

LEARNER GUIDE

National Vocational Certificate Level 1

Version 1 - September, 2018

NAVTTC

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Contents

Introduction

Welcome to your Learner's Guide for the **Electrical Machine Winding Technician** Program. It will help you to complete the program and to go on to complete further study or go straight into employment.
The **Electrical Machine Winding Technician** program is to engage young people with a program of development that will provide them with the knowledge, skills and understanding to start their career in Pakistan. The program has been developed to address specific issues, such as the national, regional and local cultures, the manpower availability within the country, and meeting and exceeding the needs and expectations of their customers.
The main elements of your learner's guide are:

- **Introduction:**
  - This includes a brief description of your guide and guidelines for you to use it effectively
- **Modules:**
  - The modules form the sections in your learner's guide
- **Learning Units:**
  - Learning Units are the main sections within each module
- **Learning outcomes**:
  - Learning outcomes of each learning units are taken from the curriculum document
- **Learning Elements:**
  - This is the main content of your learner's guide with detail of the knowledge and skills (practical activities, projects, assignments, practices etc.) you will require to achieve learning outcomes stated in the curriculum
  - This section will include examples, photographs and illustrations relating to each learning outcome
- **Summary of modules**:
  - This contains the summary of the modules that make up your learner's guide
- **Frequently asked questions**:
  - These have been added to provide further explanation and clarity on some of the difficult concepts and areas. This further helps you in preparing for your assessment.
- **Multiple choice questions for self-test**:

These are provided as an exercise at the end of your learner's guide to help you in preparing for your assessment.

ELECTRICAL MACHINE WINDING TECHNICIAN

Module-A
LEARNER GUIDE
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Module A: 0713001124 Perform Safe Transportation of Faulty Machine

Objective: This Module covers the knowledge & skills required to Perform Safe Transportation of Faulty Machine through Prepare for work, Install/Adjust Tri Pod and chain Block to lift the Machine, Lift the Machine through Tri Pod and chain block, Load Machine on the Loader, Load machine on Fork Lifter, Ensure safe shifting of Machine to Workshop , Ensure safe unloading of Machine at Workshop , Maintain Inventory Record.

Duration: 90 Hours **Theory: 18 Hours** **Practice: 72 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1. Prepare for work to perform safe transportation of faulty machine	The trainee will be able to: • Identify the required PPE's • Collect the required PPE's • Identify the required tools and equipment • Collect the required tools and equipment • Ensure functional condition of PPE's/Tools and equipment • Ensure safe working conditions ➢ Clear Passage ➢ Cleanliness ➢ Adequate light ➢ Ventilation	• Prepare list & Recognition of required Tools, Equipment and PPEs for safe transportation of of Machine • Importance of functional conditions of required Tools, Equipment and PPEs and their use • Importance of safe working condition regarding ➢ Clear passage ➢ Cleanliness ➢ Adequate light ➢ Ventilation	**Tools/PPE's** • Helmet. ,Safety shoes, Whipper, • Screw driver set • Combination plier • Spanner set • Allen key set • Portable search light • Adjustable Screw Wrench • Pipe Wrench • Hammer • Hack Saw • Cold Chisel **Consumable Material** • Safety Gloves • Tags

LU2. Install / Adjust Triod and chain Block to lift the Machine	The trainee will be able to: • Wear the required PPE's • Pick the required tools and equipment • Prepare place for installation of tripod and chain block • Install tripod and chain block • Adjust tripod and chain block	• Importance and use of required PPEs • Describe use of chain Block and Tri-Pod • Preparation of Place for installation of Tri-Pod and Chain Block • Installation Techniques of Tri-Pod and Chain Block • Adjustment/Balancing Techniques of Tri-Pod and Chain Block	**Tools** • Combination plier • Spanner Set • Hammer • **Cold Chisel** • **Tri-Pod** • **Chain Block** • **Toe Bar** **Consumable Material** • **Safety Gloves** • **Tags**
LU3. Lift the Machine through Tri Pod and chain block	• Wear the required PPE's • Pick the required tools and equipment • Identify eye bolt/hook of the machine • Fasten chain using U bolt shackle with eye bolt/hook of machine • Lift the machine up to safe and required height	• Importance and use of required PPEs • Importance and use of Eye Bolt/Hook • Fastening Techniques of Chain Block with Machine • Use of U shackle Bolt for fastening • Method of lifting machine with the help of Tri-Pod and Chain Block	• Combination plier • Spanner Set • Hammer • Cold Chisel • Tri-Pod • Chain Block • Toe Bar • U shackle Bolt **Consumable Material** • Safety Gloves
LU4.Load Machine on the Loader	• Wear the required PPE's • Pick the required tools and equipment	• Importance and use of required PPEs • Selection of loader	• Combination plier • Spanner Set • Hammer

	• Ensure right positioning of loader for loading the machine • Perform loading of machine on the loader • Un-bolt the U bolt shackle of chain from eye bolt/hook of machine • Fasten the machine at loader	according to size and weight of Machine • Importance of safe and secure positioning of loader for lifting the machine • Describe the loading procedure of machine on the loader using Tri-Pod and Chain Block • Un-Bolting the U shackle of Tri-Pod from machine and fastening Technique of machine at loader for safe Transportation	• Cold Chisel • Tri-Pod • Chain Block • Toe Bar • U shackle Bolt • Wooden Wedges/Used old Tyre **Consumable Material** • Safety Gloves • Tags
LU5.Load machine on Fork Lifter	• Wear the required PPE's • Pick the required tools and equipment • Ensure right positioning of fork lifter to load the machine • Ensure safe loading of machine on the fork lifter	• Importance and use of required PPEs • Define Fork Lifter • Selection of right Fork Lifter according to size and weight of Machine • Importance of safe and secure positioning of Fork Lifter for lifting the machine • Describe the loading procedure of machine on the Fork Lifter	• Fork Lifter • Toe Bar • Fastening Belt **Consumable Material**
LU6.Ensure	• Wear the required	• Importance and use of	• Fork Lifter

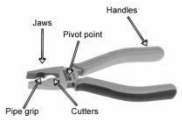
safe shifting of Machine to Workshop	PPE's • Pick the required tools and equipment • Fasten properly machine at loader / fork lifter to avoid slipping during transportation • Perform safe shifting of Machine to Workshop	required PPEs • Fastening Techniques of Machine at Loader/Fork Lifter • Importance of safe and secure shifting of Machine to workshop	• Toe Bar • Fastening Belt • Chain Block • Tri-Pod • Loader
LU7. Ensure safe unloading of Machine at Workshop	• Wear the required PPE's • Pick the required tools and equipment • Prepare site for safe unloading/placing of machine • Un load the machine from fork lifter • Prepare place for installation of tripod and chain block • Install tripod and chain block • Adjust tripod and chain block • Ensure right positioning of loader for unloading the machine • Bolt the U bolt shackle of chain with eye bolt/hook of machine • Un-fasten the machine at loader	• Importance and use of required PPEs • Preparation of Site for safe unloading/Placing of Machine in workshop • Describe Unloading Techniques/Procedure of Machine from loader using Tri-Pod and Chain Block • Describe Unloading Techniques/Procedure of Machine from loader using Fork Lifter	• Fork Lifter • Toe Bar • Fastening Belt • Chain Block • Tri-Pod • Loader

	• Perform unloading of machine from the loader • Un-bolt the U bolt shackle of chain from eye bolt of machine		
LU8. Maintain Inventory Record	• Record receiving of machine • Allot inventory number to machine • Tag machine according to inventory number	• Define Inventory • Importance of Maintaining Inventory Record • Procedure of allotting Inventory Number and Machine Tagging	• Computer System/Laptop • Printer **Consumable Material** • Lead Pencil • Rubber • Tag Inventory register

LU1.Prepare for work to perform safe transportation of faulty machine

- Prepare list Recognition of required Tools, Equipment and PPEs to perform safe transportation of faulty machine.

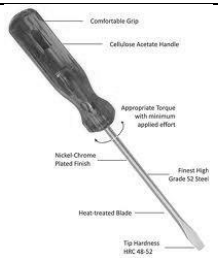
COMBINATION PLIER: Combination pliers used by electricians and other tradesmen primarily for gripping, twisting, bending and cutting wire and cable. The grips may also provide insulation for protection against electric shock when working with live circuits, to withstand a specified voltage, e.g. 1000V.



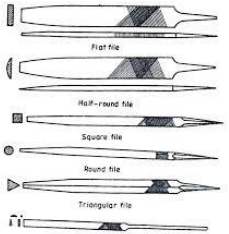
LONG NOSE PLIER: The long shape they are useful for reaching into small areas where cables or other materials have become stuck or unreachable with fingers or other means.

SIDE CUTTER: Side cutters or wire cutters are pliers intended for the cutting of wire (they are generally not used to grab or turn anything). The pliers are made of tempered steel, and inductive heating and quenching are often used to selectively harden the jaws.

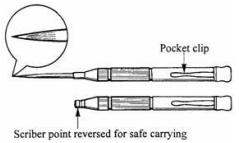
SCREW DRIVER: A screwdriver is a toolfor turning (driving or removing) screws. A screwdriver is classified by its tip, which is shaped to fit the driving surfaces slots, grooves, recesses, etc. on the corresponding screw head. Proper use requires that the screwdriver's tip engage the head of a screw of the same size and type designation as the screwdriver tip. The two most common are the simple 'blade'-type for slotted screws, and Phillips.



FILES: A file is a tool used to shape materials, by cutting away some of it. Today, files are usually made of a steel bar that has a rough surface.



SCRIBER: A scriber is a hand tool used in metalworking to mark lines on work pieces, prior to machining. The process of using a scriber is called scribing and is just part of the process of marking out. It is used by drawing the point over the surface of the work piece to leave a shallow scratch on its surface.

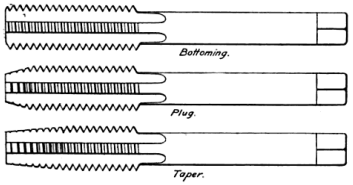


HAMMER: A hammer is a tool that delivers a blow (a sudden impact) to an object. Hammers are basic tools in many trades. The usual features are a head (most often made of steel) and a handle (also called a helve or haft). Some hammers have other names, such as sledgehammer, mallet and gavel.

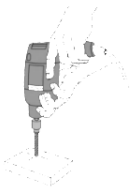
CENTER PUNCH: A punch is a hard metal rod with a shaped tip at one end and a blunt butt end at the other, which is usually struck by a hammer. Punches are used by winder to mark spots on end plates of motor to identify their alignment position.

METAL HAND SHEER: Snips, also known as shears, are hand tools used to cut sheet metal.

TAPS: A tap cuts a thread on the inside surface of a hole, creating a female surface which functions like a nut.

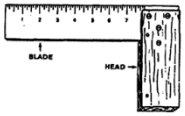


DRILL MACHINE: A drill is a tool fitted with a cutting tool attachment or driving tool attachment, usually a drill bit or driver bit, used for boring holes in various materials or fastening various materials together with the use of fasteners.



SCISSOR: Scissors are hand operated shearing tools. They consist of a pair of metal blades pivoted so that the sharpened edges slide against each other when the handles (bows) opposite to the pivot are closed. Scissors are used for cutting various thin materials, such as paper, cardboard, metal foil, cloth, rope, and wire.

TRY SQUARE: A try square is a tool used for marking and measuring a piece of Latheroid paper.



SPANNER:A wrench or spanner is a tool used to provide grip and mechanical advantage in applying torque to turn objects, usually rotary fasteners, such as nuts and boltsor keep them from turning.

SOLDERING IRON: A soldering iron is a hand tool used in soldering. It supplies heat to melt solder so that it can flow into the joint between two work pieces. Soldering irons are most often used for installation, repairs, jointing winding wires.

HACK SAW:A hacksaw is a fine-toothed saw, originally and mainly made for cutting metal.

NEEDLE NOSE PLIERS: Itis usedfor multiple tasks. They are great for reaching dropped screws or to hold a screw for drilling.

LOCK PLIER: It is used to tighten fittings when installing conduit. It can also be used to tighten lock nuts on various connectors. Mainly used for 2 inch conduit and smaller.

ELECTRICIAN KNIFE: This is a great addition to any tool set. It comes with 3 separate wire stripping accessories. It truly is 3 tools in one. Its heavy duty and comes with a limited lifetime warranty.

ELECTRICIAN LEVEL: Itis usedto install conduit, electrical cabinets and to check the level of machine.

MEASURING TAPE: This tape measure the distance between any two objects.

VOLTAGE DETECTOR: It is used to quickly determine if a circuit is on or off. It can carry easily on tool belt.

DRILL BITS: These bare usedtofit in drill machine to drill holes in metal and masonry walls.

PIPE WRENCH: The pipe wrench is an adjustable wrench with hardened serrated teeth on its jaws. The hard teeth bite into the softer metal of the round pipe.

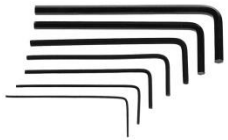
STANDARD WIRE GAUGE: Wire gauge is used to measure size of wirediameter.

INSIDE CALIPER: The inside calipers are used to measure the internal size of an object.

OUTSIDE CALIPER: Outside calipers are used to measure the external size of an object.

LLEN KEY: These Allen keys or wrenches feature a Hex-Plus head on the short arm, and on the long arm. Hex-Plus offers a bigger contact surface in the screw head, and so reduces the chance of wear and rounding off the corners in Allen head screws.

The key easily inserted into the head and permits the key to be turned at an angle, which is very useful in tight corners.



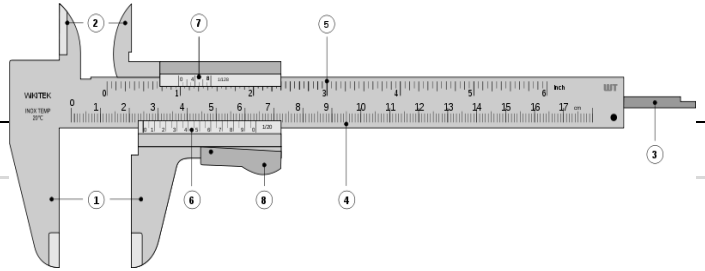
BEARING PULLER: It is used to remove bearing, gears, pulleys and flywheels. It features chrome-vanadium steel construction and reversible jaws.

STEEL FOOT RULE

The simplest and most common measuring tool. The flat steel rule is usually 6 or 12 inches long, but longer sizes are available. Steel rules can be flexible or nonflexible, thin or wide.

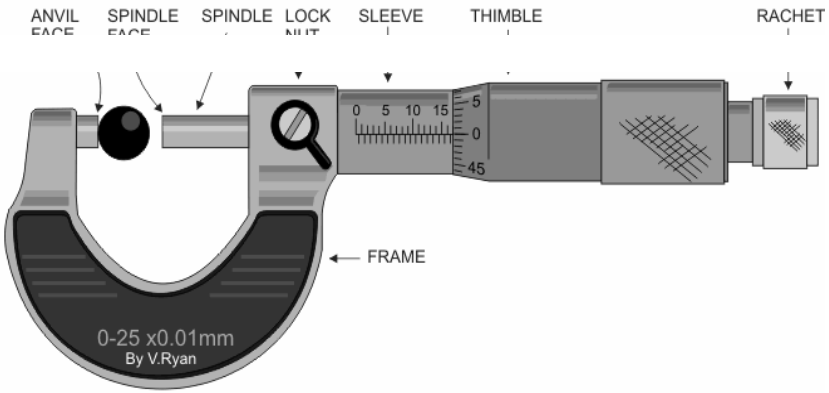
VERNIER CALIPER:

Vernier caliper is a measuring tool used to measure length. It is more accurate than meter rule. It can measure length with accuracy up to 0.01cm.The Vernier Caliper is a precision instrument that can be used to measure internal and external distances extremely accurately.



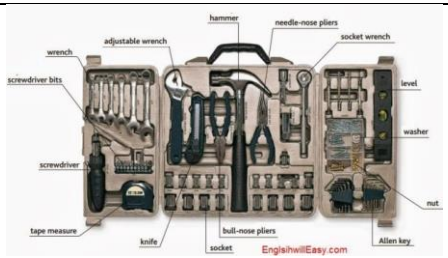
MICRO METER:

Micrometer is an instrument for making precise linear measurements of dimensions such as diameters, thicknesses, and lengths of solid bodies

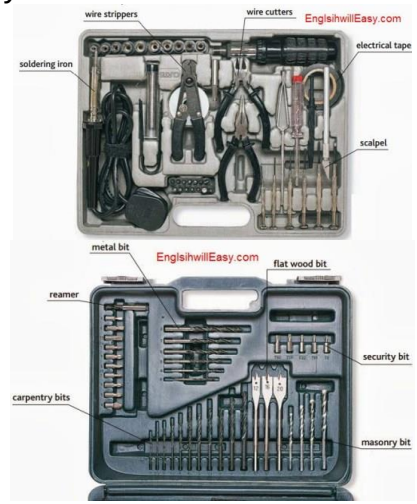


WIRE STRIPPER: A simple manual wire stripper is a pair of opposing blades much like scissors. There are several notches of varying size. This allows the user to match the notch size to the wire size, which is very important for not damaging the wires.

TOOLBOX:



Adjustable wrench, wrench, screwdriver bits, screwdriver, tape measure, hammer, knife, socket, bull-nose pliers, needle-nose pliers, socket wrench, level, washer, nut, Allen key



EQUIPEMENTS:

VOLT METER:

Volt meter is a measuring device which can measures electric pressure in an electric circuit. To measure electric pressure in an electric circuit connect a volt meter parallel across the load in electric circuit.

AMPERE METER:

An ammeter is a measuring instrument used to measure the electric current in a circuit.

OHMMETER:

An ohmmeter is an electrical instrument used to measure electrical resistance.

MULTIMETER:

A multi-meter or a multi tester, also known as a VOM (Volt-Ohm meter), is an electronic measuring instrument that combines several measurement functions in one unit. A typical multic meter would include basic features such as the ability to

measure voltage, current, and resistance.

WATTMETER:

Wattmeter is used to measure the power of the circuit.

TACHOMETER:

Tachometer isan instrument used to measure the speed of rotation of motor in revolution per minute (RPM).

FREQUENCY METER:

A frequency meter is an instrument that displays the frequency of a periodic electrical signal.

GROWLER:

A growler is an electrical device used for testing insulation of a motor for shorted coils.

TONGUE TESTER:

This instrument is used to measure current of a circuit / motor without breaking its circuit.

- **Importance of functional conditions of required Tools, Equipment and PPEs and their use**
- **Importance of safe working condition regarding**

➢ Clear passage
➢ Cleanliness
➢ Adequate light
➢ Ventilation

Types of Personal Protective Equipment (PPE)/Tools:

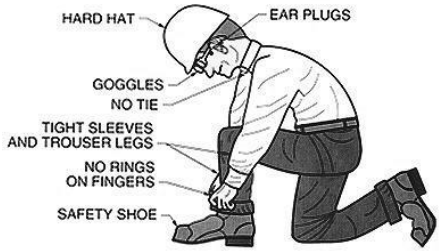
Personal Protective Equipment, commonly referred to as "PPE", is equipment worn to minimize exposure to a variety of hazards. Examples of PPE include such items as gloves, foot, head and eye protection, protective hearing devices (earplugs, muffs) hard hats, respirators and full body suits.

Selecting PPE's/Tools/equipment:

All PPE clothing and equipment should be of safe design and construction, and should be maintained in a clean and reliable fashion.

A technician requires PPE to meet the following standards:

- Eye and Face Protection:
- Head Protection:
- Hand and Foot Life Saving Kits*:*
- Insulated Gloves:



USES AND IMPORTANCE OF PERSONAL PROTECTIVE EQUIPMENT (PPE).

Use of PPE's is imperative for safety and security of personal, machine and environmental safety. Safety is a major issue for day laborers and skilled laborers. Each year, accidents happen frequently in the industry and often times it are due to the absence/non -functional condition of Personal Protective Equipment (PPE) or failure to wear the provided PPE or use of non-functional tools/equipment. PPE is equipment that will protect workers against health or safety risks on the job. The purpose is to reduce employee exposure to hazards when engineering and administrative controls are not feasible or effective to reduce these risks to acceptable levels.

- Importance of functional conditions of required Tools, Equipment and PPEs is necessary and their functional condition is required to be ensured before their use.
- Importance of safe working condition regarding

➢ Clear passage
➢ Cleanliness
➢ Adequate light
➢ Ventilation

Is also required to be put in place which is essential for safe transportation of faulty machine.

LU2. Install/Adjust Tri od and chain Block to lift the Machine

- Wearing of PPEs is necessary and their functional condition is also required to be ensured before their use so that to avoid any sort of accident. Following are the necessary PPE's:

- Eye and Face Protection
- Head Protection
- Hand and Foot
- Life Saving Kits
- Insulated Gloves

DESCRIBE USE OF CHAIN BLOCK AND TRI-POD:

Chain Block and Tri-Pod are the tools /equipment used to lift the heavy machinery for loading/unloading to the loader for shifting of the machinery from one place to another place in the industry/workshop, where precise lifting is required.

The disadvantages of manual chain hoists for engine lifting are:

- They are slower than other type of hoists;
- They have special requirements for installation areas, which limit places these hoists can be used, in opposite hydraulic hoists just need a solid and level ground. However, there are also some advantages for using manual chain hoists for engine lifting:
- They don't need electricity, oil or other additional resources to work;
- They are cheaper than electric or hydraulic hoists;
- They are simple to use and easy to repair and maintain.

PREPARATION OF PLACE FOR INSTALLATION OF TRI-POD AND CHAIN BLOCK:

Preparation of Place for installation of Tri-Pod and Chain Block is done before performing a task as without the said preparation there is a high risk of accident which may lead to heavy damage to humane, machinery or environment or to all of them.

The following measure are required to be initiated for preparation of place:

- Clear passage
- Cleanliness of tri pod & floor
- Adequate light
- Use tri pod having fitted rubber safety shoes with spiked edges. If tri pod is without rubber shoe then prepare small hole in floor under the edges of legs of tri pod to prevent it from slipping during lifting of load.

INSTALLATION TECHNIQUES OF TRI-POD AND CHAIN BLOCK:

Before each use of this equipment carefully inspects it to ensure that it is in good working condition. Check for worn or damaged parts. Ensure all parts (nuts, bolts, etc.) are present and secure. Check legs to ensure they are straight, free of cracks, dents, etc. Ensure pulleys rotate freely and entire system is free of corrosion. Do not use if inspection reveals an unsafe condition.

- **Steps for erection of Tripod:**

The tripod is shipped with the legs set at full retraction:

1) Lay the tripod on the working surface;

2) Adjust legs to required working height;

3) Tilt the tripod into an upright position;

4) Fully spread the legs, ensure legs are against bearing surface on head. The legs will automatically lock in place. To collapse tripod, pull leg down to disengage leg lock and swing leg in;

5) Position tripod over opening so working line will be located approximately in the center of the opening. Ensure footing is solid under each leg and can support the intended loads. Level the tripod by adjusting the leg height;

6) Adjust the leg chain by removing excess slack.

ADJUSTMENT/BALANCING TECHNIQUES OF TRI-POD AND CHAIN BLOCK :

The tripod must be mounted where it can be levelled using the leg adjustments. The footing must be solid under each leg, and support the intended loading. Position the tripod such that the lifeline will be directly over the intended work area when installed. Do not position the tripod where the worker will have to swing under the tripod to reach the work area. Avoid positioning the tripod where the working line may abrade against sharp edges. Never allow the working line to extend outside the legs of the tripod. Tipping of the tripod could occur.

WARNING: Except for emergency situations where leg chains may interfere with rescue, the tripod must never be used without the leg chains in place.

LU3. Lift the Machine through Tri Pod and chain block

- Wearing of PPEs is necessary and their functional condition is also required to be ensured before their use so that to avoid any sort of accident. Following are the necessary PPE's:

- Eye and Face Protection
- Head Protection
- Hand and Foot
- Life Saving Kits
- Insulated Gloves

IMPORTANCE AND USE OF EYE BOLT/HOOK:

There are many types of eye bolts that come in a variety of sizes and materials, some of the most common include forged eye bolts, screw eye bolts, shoulder eye bolts, lag eye screw and U-bolts. Each type has many practical applications in a variety of industries.

There are several guidelines to remember when using an eye bolt for pulling, pushing or hoisting. Regular rigging eyebolts should be used for straight line pulls only. For angular lifts, shoulder eye bolts are the better choice. Always inspect a threaded eye bolt prior to use and make sure the threads and receiving holes are clean. Never use an anchor eyebolt if the shank or eye has been bent, elongated, or deformed. The threaded part of eye bolts must protrude through the load so the nut is allowed full engagement of threading. If an eye bolt protrudes too far through the load, you may need to shim the bolt with washers between the nut and the load prior to putting the nut on.

DESCRIPTIONS: Select the correct size of tripod according to height and chain block system size according weight of load to be lifted, different sizes of tripod are:

7 ft. maximum height to eye bolt, 5 ft. Minimum,

9 ft. maximum height to eye bolt, 7 ft. minimum.

Aluminium construction with adjustable locking legs and safety chains. Fitted rubber safety shoes with spiked edges. Includes head mount pulley assembly and mounting bracket. The 0.5 to 100 Tons size of chain block system are available in market:

FASTENING TECHNIQUES OF CHAIN BLOCK WITH MACHINE:

- Use of U shackle Bolt for fastening: The following fastening techniques are used for U Shackle Bolt:

1) When making a sling, attach multiple sling legs to the bow, not the pin. Attaching legs to the pin can damage and weaken the sling

2) When point loading shackle to shackle, connect bow to bow or bow to pin. Never connect pin to pin.

3) Do not side load “D” shaped shackles such as chain shackles or long reach shackles. These shackles are designed and rated for in-line applied tension. Therefore, the center line of the load should coincide with the center line of the shackle. Anchor body style shackles (screw pin style, as pictured above, or bolt nut cotter anchor body style) can be side loaded. Always refer to reductions in rating charts when performing this type of rigging.

4) When securing a load, the bow of the shackle should be put into the running side of a choke.

5) When using a shackle with wire rope, the shackle must be equal to or larger than the wire rope diameter.

6) If using a shackle with synthetic slings, ensure the shackle is big enough to avoid pinching or binding the sling.

7) Shackles should not be subjected to high or low temperatures that could affect thermal treatment and the strength of the shackle. -4 degrees F to 400 degrees F is the operating range for full working load limit.

8) Always ensure shackle pins are properly engaged. Screw pin shackles need to have threads fully engaged on the shackle ear. (The pin should be flush with the outside of the shackle body or slightly past). The pin head should make contact with the shackle body. Bolt nut and cotter shackles need to have the bolt and nut properly secured with the cotter pin attached.

9) Use bolt nut cotter anchor style shackles, if shackles will remain in place as a semi-permanent application or if they will be suspending a load. Screw pin shackles are used when the shackles are removed after the lift is complete. If a screw pin shackle **is** being used to suspend the load for any length of time,

EYE-BOLT: A component (self-retracting lifeline, rope grab/ lifeline system) can be attached to either one of the eye-bolt anchorage points. Connect equipment to the eye bolt anchorage point by using a clevis and pin (minimum breaking strength of 5,000 lbs.), self-locking carabineers or self-locking snap hooks**.**

Sling Hook with Safety Catch

METHOD OF LIFTING MACHINE WITH THE HELP OF TRI-POD AND CHAIN BLOCK:

A lifting operation is an operation concerned with the lifting and lowering of a load. A lifting operation may be performed manually or using lifting equipment. Lifting operations in occur in the work shop during transportation of machinery/material from the storage place to the work bench or back. A load includes any material/machinery that is lifted or lowered by lifting equipment like Tripod or chain block.

First of all place preparation for installation of the Tripod and chain block is made, then the load is tightly fastened and adjusted /balanced and then lifted up to proper height to be loaded at the loader etc.

To lift a load, chain hoist operator needs to pull down the hand chain; this turns the cog and axle which goes through the lifting mechanism. Inside the lifting mechanism are multiple gears which increase the mechanical work applied when pulling the hand chain for dozen times using gear ratio, allowing to easily lift loads with multiple ton capacity.

So when the hand chain is pulled, the cog which is rotated by the hand chain turns the drive shaft and gears which turn the load chain sprocket, this also rotates the load chain that is looped over the load chain sprocket and lifts a load. Larger gears move slower than smaller gears, but create more force; this is why chain hoist lifts load very slowly when compared to a hydraulic hoist. At the end of the lifting chain is a grab hook, which allows easily attaching and detaching a load. Also, most chain hoist lifting mechanisms have a ratchet or braking system that prevents the load from slipping back, but allows lowering a load by pulling the other side of the hand chain.

https://www.youtube.com/watch?v=-UtMJ2mb0_U

LU4.Load Machine on the Loader

- Wearing of PPEs is necessary and their functional condition is also required to be ensured before their use so that to avoid any sort of accident. Following are the necessary PPE's:

➢ Eye and Face Protection:
➢ Head Protection:
➢ Hand and Foot Life Saving Kits
➢ Insulated Gloves

SELECTION OF LOADER ACCORDING TO THE SIZE AND WEIGHT OF MACHINE:

Selection of loader is planned according to the specified capacity of loader.

IMPORTANCE OF SAFE AND SECURE POSITIONING OF LOADER FOR LIFTING THE MACHINE:

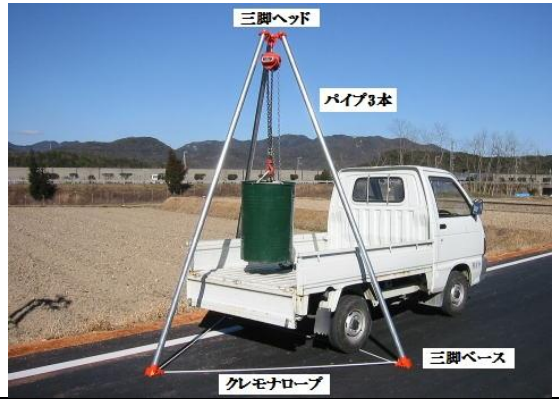
Safe and secure positioning of loader for lifting the load is critical and must be taken cared of

DESCRIBE THE LOADING PROCEDURE OF MACHINE ON THE LOADER USING TRI-POD AND CHAIN BLOCK:

For loading the machine on loader, tripod is adjusted, machine is fastened with chain block and lifted up to required height as discussed before and then following procedure should be adopted:

1). Place the loader at perfect place, under the lifted machine by chain block and tripod.
2). Down the lifted machine slowly by rotating the chain.
3). Place the machine on loader floor.
4). Adjust the position of machine on loader.
5). Un-Bolt the U shackle of chain block from machine
6). Fasten the machine at loader for safe Transportation. The following techniques are used:

➢ Fasten with wood wedges.
➢ Fasten with steel wire rope
➢ Fasten with jute rope
➢ Fasten with chain



https://www.bing.com/videos/search?q=videos+of+loading+ups+freight+onto+trucks&&view=detail&mid=5704DECC5FFEB383506E5704DECC5FFEB383506E&&FORM=VRDGAR

LU5. Load machine on Fork Lifter

- Importance and use of required PPEs:
  Wearing of PPEs is necessary and their functional condition is also required to be ensured before their use so that to avoid any sort of accident. Following are the necessary PPE's:

➢ Eye and Face Protection:
➢ Head Protection:
➢ Hand and Foot Life Saving Kits
➢ Insulated Gloves

DEFINE FORK LIFTER:

It is a self-propelled machine for hoisting and transporting heavy objects by means of steel fingers inserted under the load. In other words it is a machine that is used for lifting and moving heavy objects. It is also called lift truck, jitney, fork truck, fork hoist, and forklift truck, it is a powered industrial truck used to lift and move materials over short distances.

SELECTION OF RIGHT FORK LIFTER:

Select the right fork lifter according to size and weight of Machine to be lifted from that fork lifter.

IMPORTANCE OF SAFE AND SECURE POSITIONING OF LOADER FOR LIFTING THE MACHINE:

Safe and secure positioning of loader for lifting the load is critical and must be taken care of. It must be ensured that the right size and having the affordable capacity of Fork lifter, in line with the weight and position of the machine, has been made and the said fork lifter has been stationed at the right and secured place.

DESCRIBE THE LOADING PROCEDURE OF MACHINE ON THE FORK LIFTER:

For loading machine on fork lifter following procedure should be followed.

➢ Preparation of work place for movement and stationing of the Fork lifter
➢ Right positioning of the Fork lifter

- Assessment of Loading capacity of the Fork lifter
- Careful and balanced lifting of the machine.
- Steady driving/movement of the Fork lifter

https://www.youtube.com/watch?v=MEhK83VUPy4

LU6.Ensure safe shifting of Machine to Workshop

- Importance and use of required PPEs
- Fastening Techniques of Machine at Loader/Fork Lifter:
  - Using of the right type and size of fastening tools/materials.
  - Ensuring proper fastening of machine on the loader/Fork lifter after loading to avoid and sort of slipping during transportation.

IMPORTANCE OF SAFE AND SECURE SHIFTING OF MACHINE TO WORKSHOP:

Safe and secure shifting of machine to the workshop is important as any of the mishandling during transportation of machine may cause to humane, machine or environmental damages/ loses.

LU7. Ensure safe unloading of Machine at Workshop

- Importance and use of required PPEs
- Preparation of Site for safe unloading/Placing of Machine in workshop

DESCRIBE UNLOADING TECHNIQUES/PROCEDURE OF MACHINE FROM LOADER USING TRI-POD AND CHAIN BLOCK :

- Preparation of place for installation of tripod and chain block
- Installation of tripod and chain block
- Adjustment of tripod and chain block
- Ensure right positioning of loader for unloading the machine
- Ensure to Bolt the U bolt shackle of chain with eye bolt/hook of machine
- Perform Un-fastening of the machine at loader
- Perform unloading of machine from the loader

- Ensure to Un-bolt the U bolt shackle of chain from eye bolt of machine

DESCRIBE UNLOADING TECHNIQUES/PROCEDURE OF MACHINE USING FORK LIFTER:

- Wearing of the required PPE's
- Collection of the required tools and equipment
- Ensure right positioning of fork lifter to load the machine
- Ensure safe loading of machine on the fork lifter

LU8. Maintain Inventory Record

DEFINE INVENTORY:

The act or process of making a complete list of the things that are in a place is called an inventory.Inventory at an organization means to record all the incoming and outgoing machinery/ material on daily basis and perform proper tagging on the faulty and repaired machinery.

IMPORTANCE OF MAINTAINING INVENTORY RECORD :

1. To make ready and providing accurate the existing information belonging of asset which are located in the site.
2. Physical check will cause to avoid from theft, damaged and discrepancy of asset.
3. A complete checking of organization asset to identify the current (user, department, location, condition/ status, quantity).
4. Physical check will avoid from any troubles during Handover/ Takeover of a project to other project.
5. Physical check helps you to provide your estimate Inventory list to beneficiaries.

PROCEDURE OF ALLOTTING INVENTORY NUMBER AND MACHINE TAGGING:

- Identify the Asset Type and Category.
- Assign a Unique Identification Number.
- Determine the Type of Asset Label Required.
- Enter the Asset and Associated Information into Your inventory register/Asset Tracking System.
- Affix the Asset Tag to the Item.

ELECTRICAL MACHINE WINDING TECHNICIAN

Module-B

LEARNER GUIDE

National Vocational Certificate Level 1

Version 1 - September, 2018

Module B: Comply with Work Health and Safety Policies

Objective:

Duration: 30 Hours **Theory: 6 Hours** **Practice: 24 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
Lu1.Work safely at work place	The trainee will be able to • Identify relevant organizational safety policies and procedures • Categorize tools and equipment as per requirements • Maintain tools and equipment • Follow established safety procedures during work activities • Identify existing or potential safety issues to designated persons • Report work-related incidents and accidents to supervisor • Take necessary measures to minimizing risks		
LU2. **Communicate work health and safety (WHS) assess at work place**	The trainee will be able to: • Raise work health and safety issues with supervisor. • Contribute to workplace meetings and other consultative processes for work health and safety management at the workplace		

	• Make suggestions for improving work health and safety practices		
LU3. **Minimize risks to personal safety at work place**	• Identify situations that may endanger the personal safety • Document the incident regarding personal safety at work place • Eliminate workplace hazards regarding personal safety • Identify damaged items and equipment for personal safety • Notify supervisor regarding damaged items and equipment for personal safety		
Lu4.Minimize risks to public safety	• Identify situations that may endanger the public safety • Document the incident at work sites • Eliminate workplace hazards at work sites • Identify damaged items and equipment related to public safety • Notify Situation that may endanger situation for safety measures.		

ELECTRICAL MACHINE WINDING TECHNICIAN

Module-C
LEARNER GUIDE
National Vocational Certificate Level 1

Version 1 - September, 2018

Module C: Obey the Workplace Policies and Procedures

Objective:

Duration: 20 Hours **Theory: 4Hours** **Practice: 16 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1.Obey the workplace personal appearance and hygiene	The trainee will be able to: • Wear suitable clothes for the workplace and respect local and cultural contexts • Meet specific company dress code requirements		
LU2.Follow work ethics	The trainee will be able to: • Follow company value/ ethics code/ conduct policies and guidelines • Use company resources in accordance with company ethical standards • Conduct personal behavior and relationships in accord with company policy & procedures • Demonstrate ethical behavior with co-workers • Report work incident situations or		

	resolve accordingly		
LU3.Demonstrate the Work place behaviors	The trainee will be able to: • Practice the positive behavior • Avoid arguing • Adopt flexibility in behavior to accept the resistance		
LU4 Communicate workplace policy & procedures	The trainee will be able to: • Listen directions carefully • Ask relevant questions politely • Avoid to use abusive language/ expression • Respect co-workers and others		
LU5. Review the implementation of workplace policy & procedures.	The trainee will be able to: • Ensure proper implementation of policies • Enlist the gaps for improvement • Follow the feedback, if any		

ELECTRICAL MACHINE WINDING TECHNICIAN

Module-D
LEARNER GUIDE
National Vocational Certificate Level 1

Version 1 - September, 2018

Module D: Follow Basic Communication Skills

Objective:

Duration: Hours 50 **Theory: 10 Hours** **Practice:40 Hours**

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1. Adopt Effective listening to communicate appropriately	• Listen attentively to others to improve communication skills • Avoid interrupting while listening others • Ask questions to ensure understanding • Receive and follow instructions as given by supervisor Give the speaker regular feedback to communicate appropriately		
LU2. Develop Nonverbal communication	• Maintain eye contact to improve communication		

with peers	• Use facial expressions and gestures • Use Body language to communicate appropriately • Participate within Peers		
LU3. Prepare for Interview to get a job	• Prepare yourself for interview to employer • Follow schedule according to the sequence of interview • Use communication techniques used while appearing in interview • Provide basic evidence of related skill • Respond appropriately to strong client emotional reactions		
LU4. Use communication platform at workplace	• Convey message using different communication plate forms • Face to face • Video chat • Phone calls/messages • Social Media		

LU5. Identify communication barriers to improve interpersonal skills	• Identify communication barriers to improve communication skills with each other .i.e. a. Attitudinal barrier b. Physical Barrier c. Long differences d. Conflicting information e. Differing status, position /self-expression f. Use strategies to overcome these barriers in the client-counsellor relationship		

ELECTRICAL MACHINE WINDING TECHNICIAN

Module-E
LEARNER GUIDE
National Vocational Certificate Level 1

Version 1 - September, 2018

Module E: Operate Computer Functions(General)

Objective:

Duration: 50 Hours **Theory: 12ours** **Practice:38Hours**

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1. Set up the computer for use	**The trainee will be able to:** • Identify physical components of computer • Identify peripheral devices of the computer • Connect all components of computer • Follow procedures to turn on the computer system		
LU2. Organize files in folder	**The trainee will be able to:** • Create folders/subfolders with suitable names • Save files in relevant folders. • Rename and move folders in different drives.. • Move folders and files using drag and drop techniques • Save folders and files on different media • Search for folders/subfolders and files		

	using appropriate tool bars • Delete Folder files • Restore deleted folder files		
LU3. Shut down computer system	**The trainee will be able to:** • Save any work to be retained • Close open application programs correctly • Shut down computer		

Summary of the Modules

Module	Learning Unit	Duration
• **Module A:Perform Safe Transportation of Faulty Machine** **Aim:** The aim of this module is to develop basic knowledge, skills and understanding to Prepare for work to perform safe transportation of faulty machine, installation/adjustment of tri pod and chain block, loading and unloading the machine on Loader/ lifter an safe shifting of machine to the work shop.	**LU1.** Prepare for work to perform safe transportation of fault machine **LU2.** Install/Adjust Tri Pod and chain Block to lift the Machine **LU3.** Lift the Machine through Tri Pod and chain block **LU4.** Load Machine on the Loader **LU5.** Load machine on Fork Lifter **LU6.** Ensure safe shifting of Machine to Workshop **LU7.** Ensure safe unloading of Machine at Workshop **LU8.** Maintain Inventory Record	90
➢ **Module B:** Comply with Work Health and Safety Policies ➢ **Aim:** The aim of this module is to develop basic knowledge, skills and understanding regarding adhering to work health and safety policies required for maintaining safe working conditions at the work place.	**Lu1.Work safely at work place** **Lu2.Communicate work health and safety (WHS) assess at work place** **Lu3.Minimize risks to personal safety at work place** **Lu4.Minimize risks to public safety**	30hours

Module	Learning Unit	Duration
Module C: Obey the Workplace Policies and Procedures ➢ **Aim:** The aim of this module is to develop basic knowledge, skills and understanding to follow, demonstrate, communicate and review the work place the work place policies and procedures.	**LU1.Obey the workplace personal appearance and hygiene** **LU2.Follow work ethics** **LU3.Demonstrate the Work place behaviors** **LU4. Communicate workplace policy & procedures** **LU5. Review the implementation of workplace policy & procedures**	20 hours
• **Module D:** Follow Basic Communication Skills (General) **Aim:** The aim of this module is to develop basic knowledge; skills and understanding adopt effective listening skills, develop non-verbal communication with peers, interview preparation and identify communication barriers.	**LU1.Adopt Effective listening to Skills** **LU2. Develop Non-verbal communication with peers** **LU3.Prepare for Interview to get a job** **LU4.Use communication platform at workplace LU5. Identify communication barriers to improve interpersonal skills**	50 hours
• **Module E**. Operate Computer Functions(General) **LU1. Aims:** The aim of this module is to develop basic knowledge, skills and understanding required for operation of basic computer functions like setting up the computer for use, files organization in a folder and shut down the computer system. .	**LU1. Set up the computer for use** **LU2. Organize files in folder** **LU3. Shut down computer system**	50

Test Yourself (Multiple Choice Questions)

Level- 1

Please mark the correct one from the given options.

QNO1: What is meant by preparation of place before installation of Tripod and Chain block?

A. Provision of clear passage

B. Provision of ventilation

C. Adequate lighting

D. Place should not slippery

QNO2: Tri pod and Chain block is used to?

A. Insulate the machine

B. Lift the machine

C. De insulate the machine

D. Test the machine

QNO3: What types of fastener are used to fasten machine at loader?

A. Jute rope

B. Wooden wedges

C. Wire rope & Old used tier's

D. All of them

QNO4: What type of bolt is used to fasten the machine with chain block for lifting?

A. U Shackle Type Bolt

B. T-Shackle Type Bolt

C. V-Shackle Type Bolt

D. S-Shackle Type Bolt

QNO5: Safe transportation is ensured through?

A. Site preparation and proper fastening of machine

B. Safe loading and unloading of machine

C. Smooth driving to avoid sharp turn

D .All of them

Q NO6: Arrangement of Tools & Equipment requires knowing about:

A. Identification of tool & Equipment's

B. Prepare list of tools & equipment

C. Specifications of tool

D. None of them

Q NO7: Prior to use of tools, make sure that tools are:

A. Insulated

B. Accurate

C. Complete

D. All of them

Q NO 8: Personal, machine and environmental safety depends upon:

A. Follow company's health and safety polices

B. Politeness

C. Nature of job

D. Good physique

Q No 9: Speed of motor is measured with the help of:

A. Growler B. Multi-Meter C. Tachometer D. Watt meter

Q No. 10: Short circuit test of motor is conducted with the help of:

A. Growler B. Multi-Meter C. Tachometer D. Watt meter

Q No. 11: Which meter is used to measure current without breaking the supply cable

A. Ammeter B. Tong Tester C. Multi-Meter D. Watt meter

Q No. 12: Tick the tool used for wire twisting?

A. Wire Cutter B. Wire Striper C. Pliers D. Screw Driver

Q No. 13: which one of the below tools is used for tightening of nuts & bolts?

A. Pliers B. Spanner C. Screw Wrench D. Scriber

Q No. 14: Which one of the below tools is used for metal cutting?

A. Steel rule B. Saw C. Hacksaw D. Micrometer

Q No. 15: Which one of the below tools is used for measuring Size of wire ?

A. Steel rule B. Measuring tape C. Tachometer D. Micrometer

Answers Key	
Question Number	**Correct Answer**
1	D
2	B
3	D
4	A
5	D
6	A
7	D
8	A
9	C
10	A
11	B
12	C
13	B
14	C
15	D

National Vocational and Technical Training Commission (NAVTTC)

Plot 38, Kirthar Road, Sector H-9/4, Islamabad, Pakistan
+92 51 9044 322
+92 51 9044 322
info@navttc.org
www.navttc.org