NATURAL RESOURCES CONSERVATION AND DEVELOPMENT

Level-II

Learning Guide-66

Unit of Competence: Assist Operation and Maintenance of Irrigation and Drainage

Module Title: Assisting Operation and Maintenance Of Irrigation and Drainage

LG Code: AGR NRC2 M15 L02-LG-66

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LO2: Set-out and prepare site

Instruction Sheet	Learning Guide #66

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- carrying out Pre-operational and safety checks
- undertaking Measurement and marking out of irrigation lines
- Confirming Equipment operation and work practices

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, **upon completion of this Learning Guide, you will be able to**:

- carry out Pre-operational and safety checks
- undertake Measurement and marking out of irrigation lines
- Confirm Equipment operation and work practices

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 4.
3. Read the information written in the information “Sheet 1, Sheet 2 and Sheet 3”.
4. Accomplish the “Self-check 1, Self-check 2 and Self-check 3” **in page -3, 6 and 10** respectively.

Information Sheet-1	Carrying out Pre-operational and safety checks

1.1 Carrying out Pre-operational and safety checks

The pre-operational check is important for the workers safety. It involves a daily check of the machines health. Currently the pre-ops check is often skipped or not conducted in the right way.

Any forklift or warehouse machine that needs repairs, maintenance or is observed to be unsafe to operate has to be taken out until such repair or maintenance has been done.

How can you then tell if the forklift has to go to maintenance? The operator is responsible to perform the pre-operational check before operating the machine.

Performing the pre-operational check is important for the safety of the operator and everyone in its working environment. Unfortunately this safety check is often forgotten or ignored. Not every operator is aware about the items that need to be check before he can start his machine and begin to perform his daily tasks.

Once the pre-operational check has been performed the truck can be started and the operator can start his daily task.

For big operation it is possible to call for help. The supervisor can log-in and help the operator with potential issues.

In order to ensure that your machine is operating safely and efficiently, a proper pre-operational check is important. The pre-operational check covers a number of key components of the machine and helps to identify maintenance issues and repairs that may be required. It is important to assess the conditions observed during your inspection to determine the action required. Appropriate responses could range from immediate removal from service, often maintenance or basic repair that you will be expected to perform, or reporting conditions that will require service later.

A good pre-operational check should include:

General walk around

- ✓ check for obstacles and hazards
- ✓ look for visible fluid leaks or seepage on 'belly pans', component cases and on the ground below the machine

Fuel system (if you use tractor)

- ✓ check fuel level visually if you are not sure of gauge operation

Engine oil

- ✓ wipe dipstick before checking - some dipsticks have dual markings for idling or engine stopped measurements

Drive belts

- ✓ check for proper tension and condition

Transmission fluid

- ✓ check level with sight glass or dipstick depending on manufacturer - some dipsticks have dual markings for machine off or idling in neutral
- ✓ look for signs of discoloration or sediment

Hydraulic system fluid

- ✓ check level
- ✓ look for signs of discoloration or sediment

Hydraulic system components

- ✓ look for worn, damaged or leaking hoses, cylinders and other components

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the importance of pre-operational and safety check (5pts)

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet-2	undertaking Measurement and marking out of irrigation lines

2.1 undertaking Measurement and marking out of irrigation lines

The evaluation of surface irrigation at the field level is an important aspect of both management and design. Field measurements are necessary to characterize the irrigation system in terms of its most important parameters, to identify problems in its function, and to develop alternative means for improving the system. System characterization necessitates a series of basic field measurements before, during, and after the irrigation. In some cases, there are alternative methodologies and equipment for accomplishing the same ends.

For example, you have to goes through six stages to set up a sprinkler system. you will refer to your property's plot design often during the process to make sure the installation is done correctly.

Here are those six steps:

1. Organizing the installation materials:

You may notice that you laying out various materials and tools including PVC or poly piping, shovels, a backflow preventer, fittings, metal or pipe for above ground connections and many other tools in the installation process. You will dig trenches and may need to disturb some landscaping depending on how the plot design is laid out.

Before you begin, you will call to appropriate person find out where all utility lines are on the property. Plus, you'll contact your local water works to find out about any backflow preventer rules as well as any other regulation regarding an irrigation system installation.

2. Measuring and flagging the job site:

Someone from your utility company should come to your home to mark where public utility systems are located on the property. Next, you will need you to show where all wiring for exterior lights, gas lines, drainage pipes and other yard utilities are located.

You will need to plot out the site using flags for sprinkler head locations and will spray paint where the sprinkler utility boxes will be placed on your property. You will follow the plot plan where the pipe route will go, but she may need to make adjustments based on

- ✓ Driveways
- ✓ Sidewalks
- ✓ Trees
- ✓ Utility lines.

3. Putting in the piping, wires, sprinklers and valves: You will dig trenches 12” below grade to place the main irrigation line as well as the wires. For the lateral lines, you will dig 8”-10” below grade. Putting these lines and wires below grade protects them from aerators, lawn mowers and other landscape maintenance equipment. You will either dig trenches with a variety of shovels or you’ll use a vibratory plow to create trenches. The types of soil you have as well as common digging practices in your region determine how trenches are dug. After you finished installing the lines, you’ll backfill and compact the soil to prevent it from settling over the trenches.

   There are two types of piping you will use:

   - ✓ PVC piping: PVC is more rigid, but allows for higher flow rates.
   - ✓ Polyurethane piping: This piping is more flexible compared to PVC. It allows for curves in trenches, and it can be longer between connections. However, it has a lower flow rate compared to PVC.

4. Connecting the water system to your home’s water supply: You will connect your new water sprinkler to the city’s water:

   - ✓ If you live in a cold climate where temperatures can plummet to 32°F or below, your connection will be in the basement of your home. The connection will be made with piping going through the exterior wall.
   - ✓ If you live in a warmer climate, your connection will be in your yard.

5. Putting in the controller: Next, you will install your controller in a place that’s easy to get to with access to power.

   - ✓ For outdoor controllers, you will use a conduit to protect all wiring, and the controller will be hardwired into an electrical circuit.
   - ✓ For indoor controllers, you will drill into an exterior wall to run the wire from the outside to the controller. You’ll make sure there’s a conduit to protect the wires coming in from the outside.

6. Wrapping up the job: When you finished, you’ll make a final walk through your property making final adjustments. You’ll check each zone to make sure there are no overspray and that there’s proper water coverage. After reviewing your irrigation system, you will then turn off all the water and listen to the backflow preventer to make sure that there is no water flowing. If there is, it means there’s a leak, and you will need to fix it again.

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the importance of Measurement in irrigation fields (5pts)

Note: **Satisfactory rating 5 points** **Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Information Sheet-3	Confirming Equipment operation and work practices

3.1 Confirming Equipment operation and work practices

At this point, you need to hand over equipment that has been repaired, or on which some form of maintenance activity has taken place, and to confirm that the equipment is now ready to return to service. Following the maintenance activity, you will be required to, either set up the equipment and hand it over to a another person to complete the required start-up procedures, or complete the run-up operation yourself, ensuring that the equipment is ready for operation before handover. This will involve checking that all the required equipment and safety devices are operable and correctly set and/or calibrated, and that the equipment functions safely and correctly to the required specification.

On handing over the equipment, you will be expected to highlight any new, current or changed operating features of the equipment, and to inform the appropriate person of any future maintenance requirements. You must also ensure that you receive confirmation that everyone involved in the handover accepts that the maintained equipment is in a satisfactory condition to return to service.

Your responsibilities will require you to comply with organizational policy and procedures for the handover activities undertaken, and to report any problems with the handing over procedure that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You will be expected to work with minimal supervision, taking personal responsibility for your own actions, and for the quality and accuracy of the work that you carry out.

You have to have a good understanding of your work, and will provide an informed approach to applying maintenance handover procedures. You will confirm equipment being handed over, and its application, and will know about the operating procedures and potential problems, in adequate depth to provide a sound basis for carrying out the activities safely and correctly.

You will comply with the safety precautions required when carrying out the maintenance activities, especially those for isolating the equipment. You will be required to confirm safe working area throughout, and will understand your responsibility for taking the necessary safeguards to protect yourself and others in the workplace.

Additional Information

- ✓ Confirm that the equipment is ready for restart by carrying out **all** of the following checks, as applicable to the equipment being handed over:
    - ✓ the maintenance activity has been completed and the equipment functions to

specification

- ✓ all safety systems or features are functioning correctly
- ✓ any waste materials, safety barriers and warning signs have been removed (where appropriate)
- ✓ any auxiliary systems or equipment involved are connected and operable
- ✓ any environmental controls are operable (where appropriate)
- ✓ others involved in using the equipment are aware that the equipment is about to be operated/used

✓ carry out correct handover procedures for **one** type of equipment/service from the following:

- ✓ manual
- ✓ process/control
- ✓ medical equipment
- ✓ semi-automatic
- ✓ computer controlled
- ✓ other specific equipment
- ✓ fully automatic
- ✓ engineering services

➢ carry out **all** of the following during the handover procedures:

- ✓ operate/use the maintained equipment through a complete cycle in the presence of the appropriate person
- ✓ confirm that the other person accepts that the equipment functions satisfactorily to specification
- ✓ highlight to the appropriate person any modifications that would result in unusual features in the operating procedure
- ✓ inform the appropriate person of any future maintenance activities that may be required
- ✓ obtain agreement from the other person that they now accept responsibility for the equipment to be returned to service
- ✓ complete any necessary handover documentation
- ✓ confirm the other person knows how and who to contact for future maintenance requirements

➢ carry out handover procedures to **one** of the following:

- ✓ production/process operator

- ✓ maintenance supervisor
- ✓ supervisor of production/process
- ✓ other specific person

- carry out the handover following **two** of the following maintenance activities:
  - ✓ breakdown
  - ✓ scheduled servicing
  - ✓ preventative maintenance activity
  - ✓ modification to equipment
- complete the relevant paperwork from **one** of the following, and pass it to the appropriate people:
  - ✓ job card
  - ✓ company-specific documentation
  - ✓ maintenance log or report
  - ✓ other handover paperwork

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What information you have to confirm regarding of Equipment operation and work practices? (5pts.)

Note: **Satisfactory rating - 5 points** **Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Reference

1. https://realitymatters.eu › project › pre-operational-safety-check

2. https://realitymatters.eu › project › pre-operational-safety-check

3. https://beamersdozer.weebly.com › pre-operational-check

4. https://extension.psu.edu › pre-operational-checks-for-tractors