

052-12N-1019
Excavate with a Backhoe Loader
Status: Approved

Distribution Restriction: Approved for public release; distribution is unlimited.

Destruction Notice: None

Foreign Disclosure: FD1 - This training product has been reviewed by the training developers in coordination with the Fort Leonard Wood, MO/MSCOE foreign disclosure officer. This training product can be used to instruct international military students from all approved countries without restrictions.

Conditions: Given a mission to excavate with a backhoe loader in an operational environment, a backhoe loader with operator maintenance performed, an excavation area marked with construction survey stakes or other means identifying the length, depth and width of excavation, equipment technical manual (TM), a lubrication order (LO), an equipment records folder, and all personal protective equipment. Some iterations of this task should be performed in MOPP 4.

Standards: Excavate with a backhoe loader by performing pre-start procedures and excavating by using either the arm or bucket digging method to the required specifications; avoid contact with known underground hazards, and perform all steps adhering to all Warning and Caution statements without error, and with no damage to equipment, environment or injury to personnel.

Special Conditions: When excavating to Support Defensive Operations", the ground/area for excavation to take place will typically not be marked with construction survey stakes.

Safety Risk: Low

MOPP 4: Sometimes

Task Statements

Cue: You have been given a mission to excavate with a backhoe loader.

DANGER

None

WARNING

Be aware of and avoid all hazards and obstructions such as ditches, underground lines, trees, cliffs, overhead electrical wires, or areas where there is danger of the BHL sliding. Never lift loads in excess of capacity. Carry loads in recommended positions for maximum stability. Be aware that job site conditions may change hourly. Failure to comply may result in serious injury or death to personnel.

CAUTION

None

Remarks: AS per AR 600-55, all military personnel and DA civilians must have an OF 346 and demonstrate their proficiency in order to operate this equipment.

Notes: Excavation will be performed using either the method described in step 3 arm digging technique, step 4 bucket digging technique or both.

Performance Steps

Remarks: Refer to task 052-12N-1037 for PMCS Procedures.

Refer to task 052-12N-1004 for Interpreting Construction Grade Stakes.

1. Perform pre-start safety procedures.

a. Mount the backhoe loader.

(1) Enter operator's compartment from left side.

Note: Maintain a minimum three-points of contact at all times, i.e., two feet and one hand or two hands and one foot.

(2) Face machine when mounting and dismounting.

(3) Ensure ladders and grab handles are clean and secure before using them.

b. Utilize all Personal Protective Equipment (PPE).

c. Adjust the seat.

d. Adjust left, right and interior rearview mirrors.

e. Fasten and adjust the seat belt.

f. Adjust steering column tilt.

g. Position the direction control lever to NEUTRAL position.

h. Position engine hand throttle to the IDLE position.

i. Prime turbocharger.

j. Ensure parking brake is engaged.

k. Ensure all accessories are off.

l. Ensure all personnel are clear of machine.

m. Start the Engine

2. Prepare backhoe loader for operation.

Note:

a. Engage the parking brake.

b. Position the direction control lever to NEUTRAL position.

c. Adjust flip-over pads as required.

d. Curl FEL bucket fully forward.

e. Disengage ride control.

f. Lower the FEL bucket until the front wheels are approximately 2 inches above the ground.

g. Adjust seat all the way to rear.

h. Rotate seat to backhoe operation position and lock.

i. Adjust the left and right pilot control towers forward and back and left to right for easy reach and operator comfort.

j. Enable pilot controls.

k. Remove the swing lock pin from the transport position and place it in the storage position.

l. Set engine speed to 1200 RPM' s.

m. Lower the stabilizers to raise the rear wheels off the ground and level the BHL.

n. Select control pattern.

Note: Two backhoe control patterns are available. Pattern 1 allows boom and swing control with left backhoe control lever and dipper and bucket control with right backhoe control lever. Pattern 2 allows dipper and swing control with left backhoe control lever and boom and bucket control with right backhoe control lever.

o. Release the backhoe boom from the locked position.

p. Set engine speed to 1800 RPM's.

q. Establish a danger area.

Note: Exercise care when swinging backhoe completely to the side. In some positions, backhoe can contact stabilizers. Failure to comply may result in damage to stabilizers.

Remarks: Before starting any work, walk the area to identify hazards and plan the job. Check for signs of buried utilities lines and pipes, always check overhead clearance. Obtain a digging permit when in CONUS and when available OCONUS to ensure utilities are marked.

3. Excavate utilizing the arm-digging technique.

a. Utilize the data on ditch stakes to construct the ditch to specifications.

b. Extend the boom and dipper all the way out.

c. Roll the bucket until the cutting edge teeth are at a 30 degree angle.

d. Construct a marking cut.

e. Use the pilot controls to roll the bucket and move the boom towards the BHL to completely fill the bucket.

f. Raise the bucket high enough to clear the spoil pile and dump the excavated material in a smooth operation.

g. Use the Backhoe to move the BHL forward during digging operations.

(1) Position the front wheels in a straight forward direction.

(2) Decrease engine speed to 1200 rpm.

(3) Raise the boom and retract the dipper. Move the boom as required and position the bucket teeth on firm ground. Lower the backhoe bucket to the ground.

(4) Raise the FEL bucket approximately 1 foot above the ground.

(5) Raise the stabilizers approximately 1 foot above the ground.

Note: Do not raise both stabilizers up at the same time. Alternate between the right and left stabilizer until the proper position is achieved.

(6) Use the boom and dipper to move the machine. Slowly move the dipper out and lower the boom at the same time being careful not to raise the rear wheels off the ground.

Note: The backhoe bucket must remain firmly in contact with the ground when moving the BHL forward.

(7) At the new position, lower the stabilizers and FEL bucket to the ground, raise the front and rear wheels off the ground and apply parking brake.

(8) Continue excavating.

h. Continue the arm-digging technique until the required length and depth of area is reached.

4. Excavate utilizing the bucket-digging technique.

- a. Utilize the data on ditch stakes to construct the ditch to specifications.
- b. Extend the boom and dipper all the way out. Adjust the bucket so that it is aligned with the dipper arm.
- c. Put pressure on the boom to force the bucket teeth into the ground.
- d. Roll the bucket toward the BHL until it is full. Raise the boom slightly if the bucket stalls.
- e. Raise the bucket high enough to clear the spoil pile, and dump the excavated material using a smooth operation.
- f. Use the Backhoe to move the BHL forward during digging operations.

(1) Position the front wheels in a straight forward direction.

(2) Decrease engine speed to 1200 rpm.

(3) Raise the boom and retract the dipper. Move the boom as required and position the bucket teeth on firm ground. Lower the backhoe bucket to the ground.

(4) Raise the stabilizers approximately 1 foot above the ground.

Note: Do not raise both stabilizers up at the same time. Alternate between the right and left stabilizer until the proper position is achieved.

(5) Use the boom and dipper to move the machine. Slowly move the dipper out and lower the boom at the same time being careful not to raise the rear wheels off the ground.

Note: The backhoe bucket must remain firmly in contact with the ground when moving the BHL forward.

(6) At the new position, lower the stabilizers and FEL bucket to the ground, raise the front and rear wheels off the ground and apply parking brake.

(7) Continue excavating.

- g. Continue the bucket-digging technique until the required length and depth of the area is reached.

5. Backfill a trench/excavation.

Note: Restore the site to its original condition to prevent environmental damage.

- a. Position the front bucket to Dozer the configuration.
- b. Position the BHL at a 90 degree angle to the spoil.
- c. Lower the bucket to about ½ inch above the ground surface.

d. Position the direction control lever to FORWARD and drive forward into the material and continue until material falls into trench/hole approximately half way across the trench.

Note: If wheel slippage becomes a problem, press and hold the differential lock switch to engage the differential lock before driving straight forward. Do not turn while differential lock is engaged. Releasing the differential lock switch disengages the differential lock.

- e. Raise the bucket approximately 18 inches from the ground.

- f. Position the direction control lever to REVERSE and back the BHL to position it at approximately 1/2 the width of the bucket for next pass.

6. Level the area.

- a. Using the 4-in-one bucket as a scraper or a dozer, level the work area by lowering the bucket to approximately 1/2 inch off the ground.

Note: If the spoil is higher than 2' or is dense (wet clay/mud), raise the boom so the bucket will push the upper 1/2 of the spoil. When making the next pass, position the bucket to take the rest of the pile. If wheel slippage becomes a problem, use a smaller portion of the bucket to move the spoil.

- b. Feather the spoil out at the end of each pass.

- c. Use the 4-in-one bucket as a scraper to back drag the work area, while keeping pressure on the bucket and lifting slightly to feather material.

(Asterisks indicates a leader performance step.)

Evaluation Guidance: Score the Soldier GO if all steps are passed (P). Score the Soldier NO-GO if any step is failed (F). If the Soldier fails any step, show the Soldier how to do it correctly.

Evaluation Preparation: Setup: Provide all the items listed in the conditions section. Brief Soldier: Tell the Soldier to complete the performance measures according to the standards set forth in the task.

PERFORMANCE MEASURES	GO	NO-GO	N/A
1. Performed pre-start safety procedures.			
2. Prepared backhoe loader for operation.			
3. Excavated utilizing the arm-digging technique.			
4. Excavated utilizing the bucket-digging technique.			
5. Backfilled a trench/excavation.			
6. Leveled the area.			

Supporting Reference(s):

Step Number	Reference ID	Reference Name	Required	Primary
	AR 385-10	The Army Safety Program http://www.apd.army.mil/pdf/files/r385_10.pdf	Yes	No
	ATP 5-19 (Change 001 09/08/2014 78 Pages)	RISK MANAGEMENT http://armypubs.army.mil/doctrine/DR_pubs/dr_a/pdf/atp5_19.pdf	Yes	No
	DA FORM 5987-E	MOTOR EQUIPMENT DISPATCH (EGA)	Yes	No
	DA FORM 5988-E	Equipment Inspection Maintenance Worksheet	Yes	No
	DD FORM 518	ACCIDENT-IDENTIFICATION CARD	Yes	No
	PAM 750-8	The Army Maintenance Management System (TAMMS) Users Manual.	Yes	No
	SF FORM 91	MOTOR VEHICLE ACCIDENT REPORT	Yes	No
	TM 3-34.62	Earthmoving Operations (MCRP 3-17.71)	Yes	Yes
	TM 5-2420-231-10	OPERATOR's MANUAL FOR TRACTOR, WHEELED, INDUSTRIAL BACKHOE LOADER (BHL) (NSN 2420-01-532-3399)	Yes	No

TADSS : None

Equipment Items (LIN):

LIN	Name
MB3007	Grease Gun
DA152G	Helmet, Safety
J63269	GLOVES WRK LTHR BLK 4
C08735	BOOTS SAFETY 8R
HA4064	Goggles, Industrial
HA4006	Protector, Hearing
T34505	Tractor Wheeled: Industrial

Materiel Items (NSN) :

Step ID	NSN	LIN	Title	Qty
	7920-00-205-1711		Rag, Wiping, Cotton, Unbleached, Mixed Color	1
	5510-00-171-7734		Stake, Wood, Wedges and General Construction, 1 X 2 X 18 Inches, Bundle of 50	1
	2420-01-532-3399	T34505	Tractor, Wheeled, Industrial: HMEE III	1

Environment: Environmental protection is not just the law but the right thing to do. It is a continual process and starts with deliberate planning. Always be alert to ways to protect our environment during training and missions. In doing so, you will contribute to the sustainment of our training

resources while protecting people and the environment from harmful effects. Refer to the current Environmental Considerations manual and the current GTA Environmental-related Risk Assessment card. It is the responsibility of all Soldiers and DA civilians to protect the environment from damage. Avoid unnecessary stripping of vegetation and waterways. Control dust conditions and limit water erosion by dressing area at the end of each day. Explain the purpose of drip pans and their location under the equipment. Avoid unnecessary equipment usage and follow established procedures for cleanup of fluid leaks. Restore site and surrounding areas as close as possible to the original ecological condition.

Safety: In a training environment, leaders must perform a risk assessment in accordance with ATP 5-19, Risk Management. Leaders will complete the current Deliberate Risk Assessment Worksheet in accordance with the TRADOC Safety Officer during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection, FM 3-11.5, Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Decontamination. Review local training area SOP. Know and adhere to all hand and arm signals. Perform an equipment walk-around before and after operation. Maintain three points of contact when mounting and dismounting. Wear goggles and gloves when checking batteries, hydraulic tank, and fueling the equipment. Wear hearing protection, kevlar /hard hats, safety boots and seat belts when operating or around running equipment. Do not wear loose clothing or jewelry. Utilize drip pans and always look in the direction of travel. Use caution when working on hills, banks, or steep slopes to avoid tipping. DO NOT place transmission in neutral to allow the equipment to coast.

Prerequisite Individual Tasks : None

Supporting Individual Tasks : None

Supported Individual Tasks : None

Supported Collective Tasks : None

Knowledges :

Knowledge ID	Knowledge Name
K0600	Knowledge of Personal Protective Equipment
011-1528K	knowledge of safety precautions in the workplace
K0601	Knowledge of Environmental Considerations
K0621	Operate Equipment Hydraulic Controls
K0622	Equipment Implement Travel Positions
K0619	Slowing/Stopping Equipment
052-K-00282	Know Safety Procedures
K0620	Up-shifting/Down-shifting Equipment
91L-K-004	Know the procedures for using Safety Equipment
K0615	Knowledge of Equipment Fluid Capacities
K0613	Knowledge of Before, During, After, Weekly, and Monthly Equipment Inspections
K0618	Maneuver across various types of Terrain
K0617	Starting/Stopping Equipment Engines
K0616	Knowledge of how to Read, Interpret and Relay Hand and Arm Signals
011-957K	knowledge of property accountability
K0604	Knowledge of The Army Maintenance Management System
K0607	Knowledge of Equipment Deficiencies
K0609	Knowledge of how to Obtain and Utilize the Appropriate Equipment Technical Manual

Skills :

Skill ID	Skill Name
551-S-0048	Ability to read, interpret, and relay visual hand and arm signals
S0603	Ability to Read, Comprehend, and Analyze Information on Instrument Panel Gauges
S0604	Ability to Read, Comprehend, and Perform Instructions in Equipment Technical Manuals
S0611	Manipulate Hydraulic Controls
551-S-0022	Ability to read and interpret maintenance forms and records
S0612	Read, Comprehend, and Comply with Traffic Signs and Markings
S0606	Ability to Utilize Equipment Maintenance Hand Tools
S0072	Record Data on Maintenance Forms
S0607	Ability to Safely Handle Petroleum, Oils, and Lubricants
S0608	Ability to Read and Comprehend, and Comply with Environmental Considerations
805C-S-0724	Ability to collect, analyze and record data

ICTL Data :

ICTL Title	Personnel Type	MOS Data
12N10, Horizontal Construction Engineer, Skill Level 1	Enlisted	MOS: 12N, Skill Level: SL1, ASI: C4
12N10, Horizontal Construction Engineer, Skill Level 1, Version 2	Enlisted	MOS: 12N, Skill Level: SL1