

UNITED STATES MARINE CORPS  
Logistics Operations School  
Marine Corps Combat Service Support Schools  
Training Command  
PSC Box 20041  
Camp Lejeune, North Carolina 28542-0041

LVSM 7104

**DETAILED OUTLINE**

**OPERATE THE MK17**

**LEARNING OBJECTIVES**

1. Terminal Learning Objective: Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, perform an operational check on the crane, per the reference. (3521.13.03)
2. Enabling Learning Objectives:
  - a. Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, extend the outriggers, per the reference. (3521.13.03a)
  - b. Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, extend the stabilizers, per the reference. (3521.13.03b)
  - c. Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, unstow the crane, per the reference. (3521.13.03c)
  - d. Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, raise the boom, per the reference. (3521.13.03d)
  - e. Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, rotate the crane, per the reference. (3521.13.03e)
  - f. Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, extend the boom, per the reference. (3521.13.03f)
  - h. Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, life the load, per the reference. (3521.13.03g)
  - i. Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, operate the crane electronically, per the reference. (3521.13.03h)
  - j. Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, swing the load, per the reference. (3521.13.03i)

k. Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, lower the load, per the reference. (3521.13.03j)

l. Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, retract the load, per the reference. (3521.13.03k)

m. Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, stow the boom, per the reference. (3521.13.03l)

n. Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, retract the stabilizers, per the reference. (3521.13.03m)

o. Given an MK48/MK17 combination, TM 2320-10/11A, tools, and equipment, retract the outriggers, per the reference. (3521.13.03n)

## **OUTLINE**

1. **GENERAL DESCRIPTION OF THE MK17.** The MK17 is designed to transport palletized cargo and ISO/ANSI containers. The side panels of the cargo bed can be dropped down or removed to ease on and off-loading. The side panels also provide seating for troops. From a mechanic's perspective, you will be most interested in the material handling crane and the stabilizers that are mounted on the rear of the MK17. The chassis and driveline of the MK17 are essentially the same as the MK14 that you have already been trained to operate.

a. The material handling crane (MHC) consists of four major components:

- (1) main boom,
- (2) folding boom, and
- (3) two extension booms.

b. The stabilizers, as their name implies, stabilize the MK17 when they are deployed and the MHC is in use. The stabilizer system consists of two major components:

- (1) Outrigger beams, and
- (2) Stabilizer cylinders.

c. The crane is operated by hydraulics supplied by the MK48 through the main control panel. The main control panel provides the controls to manually perform all the operations of the crane and stabilizers.

(1) Each control is proportional, the further the control is moved, the faster the selected crane or stabilizer movement is.

(2) The crane may also be operated by a remote control unit (RCU) with the same operating functions, except for the stabilizer controls, as the main control.

(3) The stabilizers cannot be operated by remote control but an additional stabilizer control is provided, separate from the main control panel, on the right side of the vehicle.

d. The main boom column can rotate 350 degrees with a ten degree dead spot at the main control panel. This dead spot prevents the operator from swinging the load over his head when the operator is standing at the main control panel.

e. The crane has a lifting capacity of nine thousand pounds with the boom fully extended to fifteen feet and the stabilizers in position.

f. Built within the hydraulic system of the crane are several safety features that protect the equipment and the operating personnel. They are as follows:

(1) Holding valves. These valves are one-way check valves that allow oil to flow in one direction but not the other. The main, folding, and extension boom functions have a holding valve incorporated within each system which prevents the load from falling in the event of pressure loss because of a hydraulic line failure.

(2) Hose breakage valves

(a) These valves are installed at the inlet and outlet ports of the extension cylinders. Hose breakage valves are like check valves; if a hose in the extension circuit breaks, the sudden rush of hydraulic oil leaving the cylinder will close the hose breakage valve, thus trapping the oil in the extension cylinder. This will lock the cylinder and prevent the load from crashing to the ground.

(b) A suspended load on the crane can be lowered when hydraulic pressure is lost at the MK48 if external hydraulic lines from an MK48/15 Wrecker/Recovery vehicle are attached to the quick disconnect couplings at the front of the crane trailer. Should a hydraulic failure occur in the crane's trailer, the suspended load can be lowered by adjusting the cylinder holding valve(s). Only mechanics can perform holding valve adjustments and you will be taught how to do that later in this course.

(3) Capacity Alert System. This system, comprised of six components, protects the crane from damage caused by an overloaded condition. If the crane has reached its maximum load capacity, this system will stop all functions that increase the crane's lift and reach capacities. Since increasing the crane's lift and reach results in added stress on the crane, the capacity alert system allows all functions that lower and/or retract the crane's load, thus preventing damage to the crane.

## **2. IDENTIFICATION OF THE CONTROLS AND COMPONENTS USED IN THE OPERATION OF THE CRANE AND STABILIZERS MOUNTED ON THE MK17**

a. Vertical Stabilizer Lock Valves. There is a lock valve on each of the stabilizer cylinders. The lock valves have two positions. When a lock valve is in the UNLOCK position, the corresponding stabilizer cylinder can be raised or lowered. In the LOCK position, the stabilizer cylinder will not function.

b. Stabilizer Cylinder. The stabilizer is used to support or level the vehicle during crane operation.

c. Stabilizer Cylinder Lock Pin. The lock pin locks the stabilizer cylinder in either the stowed or working position.

d. Stabilizer Extension Lock Valves. Each stabilizer extension lock valve (sometimes referred to as the outrigger selector lock valves) has two positions. In the UNLOCK position, the outrigger extension cylinders will extend or retract the outrigger beams. In the LOCK position, the outrigger beam extension cylinders will not move.

e. Remote Control Stowage Box. The stowage box is used to store the remote control unit (RCU) and its cable. Pull the rubber tee handle to open the stowage box.

f. Material Handling Crane. As previously stated, the crane consists of the main boom, folding boom and two extension booms.

g. Elevation Indicator. The elevation indicator reads out in degrees from zero to 86 degrees. The maximum lifting capacity of the crane is reached when the boom elevation indicator is at 45 degrees.

h. Crane Hook. The crane hook is used to attach a load to the crane.

i. Main Control Panel. The main control panel contains the following controls:

(1) Rotation. Rotates the crane clockwise or counterclockwise.

- (2) Main Boom. Raises or lowers the main boom.
- (3) Folding Boom. Raises or lowers the folding boom.
- (4) Boom Extension. Extends or retracts the extension booms.
- (5) Near Side Stabilizer. Extends or retracts either the near side stabilizer cylinder or the outrigger beam.
- (6) Far Side Stabilizer. Extends or retracts either the far side stabilizer cylinder or the outrigger beam.
- (7) MANUAL/OFF/REMOTE Switch. A three-position switch that allows for the selection of either manual or remote controls.
- (8) Electrical Failure Valve. Allows the crane to continue its operation in the event of an electrical failure by use of manual controls only.

### **3. PERFORMANCE OF THE PREOPERATIONAL SAFETY CHECKS**

- a. When possible, position the vehicle on firm and level ground and check for overhead obstructions.
  - b. Place the transmission shifter in neutral (N), and pull the parking brake valve OUT.
  - c. With the engine shut down, turn the ignition switch to ON.
  - d. Remove the remote control unit and the cable from the stowage compartment.
  - e. Prior to connecting the remote control cable, ensure the MANUAL/OFF/REMOTE switch is in the OFF position. Connect the remote control cable to the cable receptacle and secure the receptacle with the latch.
  - f. Connect the other end of the cable to the remote control receptacle and secure it with the latch.
- (1) Turn the MANUAL/OFF/REMOTE control switch to REMOTE. The red indicator light on the remote control should be on, indicating the control is ready for operation.
  - (2) The RCU is equipped with two deadman switches, one on each end of the unit. One of them can easily be depressed whether you're right-handed or left-handed.

(3) These switches are a safety feature and you simply release the switch to stop operations during an emergency or any other time.

(4) One of the two deadman switches must be depressed and held to activate the remote control. Depress and hold one of the two deadman switches on the remote control. The green indicator light should be on, indicating a connection has been made between the remote control and the actuator box.

(5) Continue to hold one of the deadman switches. Check that the control levers are locked into the center (neutral) position and that these levers are in a straight line. If any lever will not lock or does not line up, notify your supervisor.

(6) While depressing the deadman switch, move the control levers on the remote control in both directions. Make sure the main control panel levers agree with the remote control and are functioning properly. If the controls do not agree or are not functioning properly, notify your supervisor.

(7) Turn the MANUAL/OFF/REMOTE switch to OFF.

g. Any failure of the remote control during preoperational checks will not prevent the use of the crane. Failures, however, prevent the use of any remote control function until repairs/adjustments can be made.

#### **4. DEPLOYMENT OF THE STABILIZERS**

a. Start the engine, pull out the selector valve to the AUXILIARY position and, at the main control panel, turn the MANUAL/OFF/REMOTE switch to MANUAL.

b. Using the control station at the right rear of the trailer, deploy the right stabilizer as follows:

(1) Place the stabilizer extension lock valve in the UNLOCK position.

(2) Using the stabilizer control, slowly extend the outrigger beam fully.

(3) Place the stabilizer extension lock valve in the LOCK position.

(4) Now place the stabilizer cylinder lock valve in the UNLOCK position.

(5) Pull the retaining pin to free the quick release cable.

(6) Using the stabilizer control, slowly extend the stabilizer cylinder until there is approximately one to two inches of slack in the quick release cable.

(7) Remove the quick release pin from the stabilizer cylinder lock pin. Remove the stabilizer cylinder lock pin and pull the stabilizer towards the rear of the vehicle to start the stabilizer in the downward position.

(8) Using the stabilizer control, slowly retract the stabilizer cylinder fully. The stabilizer cylinder will rotate into position.

(9) Using the cable release handle, remove the quick release cable from the stabilizer cylinder.

(10) Install the stabilizer cylinder lock pin and the quick release pin.

(11) Using the stabilizer control, extend the stabilizer cylinder until the stabilizer cylinder base plate contacts the ground. Do not apply pressure to the ground at this time.

c. Using the near side stabilizer control at the main control panel at the left rear of the trailer, deploy the near side stabilizer, following the same procedures as you did on the far side.

d. Now, using both the near side and the far side stabilizer controls at the main control panel, extend the stabilizer cylinders until both of the rear springs are off their spring seats.

e. Place both stabilizer cylinder lock valves in the LOCK position.

## **5. MANUAL OPERATION OF THE CRANE CONTROLS**

a. Remove the retaining pin and the stowage pin from the crane and the stowage bracket.

b. When the crane is in the stowed position, the folding boom is inverted or upside down, therefore you must move the folding boom control down in order to raise the folding boom off the boom rests. The folding boom brackets must be off the rest so that the crane can be unstowed.

c. Move the main boom control up to raise the main boom to 86 degrees (boom unstowed) as indicated by the elevation indicator on the main boom.

d. Move the folding boom control up and raise the folding boom until it is parallel to the deck to clear the rear of the trailer.

e. Move the main boom control to position the main boom at 45 degrees, as indicated by the indicator on the main boom, for maximum lifting capacity.

f. Move the folding boom control up to raise and down to lower the folding boom.

g. Move the extension boom control up to extend and down to retract the extension booms.

h. Move the rotation control up to rotate the crane clockwise and down to rotate the crane counterclockwise.

i. Unstow the hook by pulling back on the latch and lifting the hook off the pin.

## **6. OPERATION OF THE CRANE WITH THE REMOTE CONTROLS**

a. First, turn the MANUAL/OFF/REMOTE switch on the main control panel to OFF.

b. Next, place the strap around your neck and hook the buckle on your belt. Adjust the strap as necessary.

c. Connect the remote control cable to the remote control receptacle and secure the latch.

d. Connect the other end of the remote control cable to the remote control and secure the latch.

e. Turn the MANUAL/OFF/REMOTE switch on the control panel to REMOTE. The red indicator light on the remote control should be ON, indicating the control is ready.

f. Depress and hold one of the two deadman switches on the remote control unit.

g. Move the extension boom control forward to extend and back to retract the extension booms.

h. Move the folding boom control forward to raise and back to lower the folding boom.

i. Move the main boom control forward to raise and back to lower the main boom.

j. Move the rotation control forward to rotate the crane clockwise and back to rotate the crane counterclockwise.

## **7. EMERGENCY OPERATING PROCEDURES DUE TO AN ELECTRICAL FAILURE**

a. Electrical Failure. The manual controls must be used to operate the crane when an electrical failure has occurred. In the event of an electrical failure, all crane movement will stop. Operate the crane as follows:

(1) First turn the MANUAL/OFF/REMOTE switch on main control panel to OFF.

(2) Pull the electrical failure valve, referred to as the emergency manual shut down valve in the operator's manual, to the CLOSED position, and complete the crane operation with the manual controls.

b. If a hydraulic failure occurs, notify your supervisor.

## **8. STOWING THE CRANE.**

a. First, lift the hook and secure it on the stowage pin. Make sure the latch closes so the hook is secure.

b. Use the main boom control to raise the main boom to 86 degrees (boom unstowed) as indicated on the elevation indicator.

c. Using the folding boom control, raise the folding boom until it is parallel with the deck.

d. The extension booms must be fully retracted before stowing the crane; otherwise, the extension boom can cause damage by striking the crane base. The boom extension control is used to fully retract both of the extension booms.

e. Next, use the rotation control to aline the alinement marks on the boom stowage plates.

f. Use the folding boom control to slowly fold the boom. Hold the control down until the folding boom will not travel any farther.

g. Use the main boom control to slowly lower the main boom to the stowed position. Some adjustment may be required, using the rotation control and

the folding boom control until the pin holes in the stowage bracket and the crane are aligned so the pin can be installed.

h. Now, install the stowage pin through the hole in the stowage bracket and the crane and install the quick release pin through the hole in the stowage pin.

i. Next, turn the MANUAL/OFF/REMOTE switch on the control panel to OFF.

j. Now, push the crane controls all the way up and down to release the hydraulic pressure.

## **9. STOWING THE STABILIZER OUTRIGGER BEAMS AND STABILIZER CYLINDERS.**

a. Turn the MANUAL/OFF/REMOTE switch on the main control panel to MANUAL.

b. Unlock the left stabilizer cylinder lock valve.

c. Use the near side stabilizer control to fully retract the stabilizer cylinder.

d. Remove the stabilizer cylinder lock pin and the quick release pin from the left side of the stabilizer.

e. Turn the cable release handle and insert the quick disconnect cable. Make sure the cable is secure on the handle pin.

f. Using the near side stabilizer control, extend the stabilizer cylinder. The stabilizer cylinder will swing into the stowed position.

g. Install the stabilizer cylinder lock pin and the quick release pin.

h. Use the near side stabilizer control to retract the stabilizer cylinder.

i. Place the near side stabilizer cylinder lock valve in the LOCK position.

j. Secure the quick release cable with the retaining pin and pull up on the quick release cable so that all cable slack is above the retaining pin.

k. Repeat these stowing procedures for the far side stabilizer cylinder.

l. Unlock the stabilizer extension lock valve (outrigger selector lock valve).

- m. Using the near side stabilizer control, retract the outrigger beam fully.
- n. Lock the stabilizer extension lock valve (outrigger selector lock valve).
- o. Repeat these stowing procedures for the far side outrigger beam.
- p. Turn the MANUAL/OFF/REMOTE switch on the control panel to OFF.
- q. Push the stabilizer controls all the way up and down to release hydraulic pressure.
- r. Push the selector valve in to the steering position.
- s. Shut down the engine.
- t. Coil the remote control cable and secure it in the stowage compartment.

**REFERENCE**

TM 2320-10/11A