

UNITED STATES MARINE CORPS
ENGINEER EQUIPMENT INSTRUCTION COMPANY
MARINE CORPS DETACHMENT
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FORT LEONARD WOOD, MISSOURI 65473-8963

LESSON PLAN

TRACTOR, RUBBER TIRED, ARTICULATED STEERING, MULTIPURPOSE
JOHN DEERE 624KR

LESSON ID: BEE0-B03

BASIC ENGINEER EQUIPMENT OPERATOR COURSE

CID A1613F1

REVISED 10/24/2011

APPROVED BY _____

DATE _____

(ON SLIDE #1)

INTRODUCTION

(10 MIN)

1. **GAIN ATTENTION.** Show Video (Front End Loader)

2. **OVERVIEW.** Good morning, my name is _____, the purpose of this lesson is to give you the tools, knowledge, and skills to safely and effectively operate a Tractor Rubber tired articulated steering Multipurpose (TRAM) in support of engineer operations. I will cover safety guidelines, characteristics and capabilities, operator controls, pre-operation checks, starting and stopping procedures, changing attachments. This lesson relates to the Marine Corps engineer mission.

3. **LEARNING OBJECTIVES.**

INSTRUCTOR NOTE

Introduce learning objectives.

(ON SLIDE #2)

a. **TERMINAL LEARNING OBJECTIVE.**

(1) Provided engineer equipment, tools, equipment records and references, conduct engineer equipment preventive maintenance so that equipment is checked and serviced per the appropriate technical manual and actions/deficiencies/discrepancies are recorded per TM 4700-15/1H. (1345-MANT-1001)

(2) Provided a TRAM, an engineer requirement, and equipment records and forms, operate the tractor, rubber-tired, articulated steering, multi-purpose (TRAM) 624KR to safely meet operational requirements with no injury to personnel or damage to the equipment. (1345-XENG-1002)

(ON SLIDE #3,4,5,6,7 & 8)

b. **ENABLING LEARNING OBJECTIVE.**

(1) Given the description and characteristics of the 624KR (TRAM), and without the aid of references, identify the characteristics per the TM 11412A-OR. (1345-XENG-1002a)

(2) Provided a 624KR (TRAM), engineer equipment records and forms, and with the aid of references, initiate operator forms and records per the TM 4700-15/1_. (1345-XENG-1002b)

(3) Provided a 624KR (TRAM), engineer equipment records and forms, technical manuals and lubrication orders, perform technical manual research per the TM 11412A-OR. (1345-XENG-1002c)

(4) Provided a 624KR (TRAM), engineer equipment records and forms, tools, and with the aid of references, demonstrate correct use of tools per the TM 10209-10/1. (1345-XENG-1002d)

(5) Provided a 624KR (TRAM), engineer equipment records and forms, tools, petroleum, oils, and lubricants and with the aid of references, demonstrate correct use of petroleum, oils, and lubricants per the TM 11412A-OR. (1345-XENG-1002e)

(6) Provided a 624KR (TRAM), engineer equipment records and forms, tools, petroleum, oils, and lubricants, and with the aid of references, perform operation checks (before, during, and after) per the TM 11412A-OR. (1345-XENG-1002f)

(7) Provided a 624KR (TRAM), an operator, and without the aid of reference, perform hand and arm signals per the FM 21-60. (1345-XENG-1002g)

(8) Provided a 624KR (TRAM) with forks, engineer equipment records and forms, and references, perform material handling operations per the TM 11412A-OR. (1345-XENG-1002h)

(9) Provided a 624KR (TRAM) with bucket, engineer equipment records and forms, and reference, perform bucket/clamshell operations per the TM 11412A-OR. (1345-XENG-1002i)

(10) Provided a 624KR (TRAM), attachments, tools, engineer equipment records and forms, and references, change attachments per the TM 11412A-OR. (1345-XENG-1002j)

(11) Provided a 624KR (TRAM), engineer equipment records and forms, and with the aid of references, complete operator forms and records per the TM 4700-15/1_. (1345-XENG-1002k)

(12) Provided a 624KR (TRAM), tools, petroleum, oils, and lubricants, equipment records, and references, Conduct preventive maintenance per the TM 11412A-OR. (1345-MANT-1001c)

(ON SLIDE #9)

4. **METHOD/MEDIA**. This lesson will be taught utilizing the lecture, demonstration, and practical application methods. I will be added with the use of video, computer-aided graphics, your outline, and the actual end item of equipment.

INSTRUCTOR NOTE

Explain Instructional Rating Forms to students

5. **EVALUATION**. You will be evaluated on this period of instruction on the morning of the fifth training day. This will be in the form of a written exam, multiple-choice, twenty-five question test. That same afternoon you will be evaluated on your practical evaluations.

6. **SAFETY/CEASE TRAINING (CT) BRIEF**. Ensure seat belt is fastened at all times. All controls will remain in the neutral position until utilized. Apply Service and Parking Brakes when stationary. No passengers are allowed at any time. Be aware of all pinch points when servicing or around equipment. Keep hands and feet in the cab at all times. Before and during operation, check all clearances to power lines or other obstructions and keep all pedestrians/ground guides at a safe distance. Wear hardhat at all times. Every Marine is responsible for safety. If you witness an unsafe act you will call cease training and report it to your Instructor. Dress appropriate for the weather.

TRANSITION. Are there any questions on what we will cover, how we will cover it, and how you will be evaluated? If not, let's start by discussing the general characteristics and capabilities of the TRAM.

BODY

(34HRS 45 MIN)

(ON SLIDE #10)

1. **CHARACTERISTICS AND CAPABILITIES**. (50 Min)

a. **Description**. The TRAM stands for Tractor, Rubber Tired, Articulated Steering, Multipurpose. The Tram 624KR is a fully

hydraulic, rough terrain forklift/loader manufactured by John Deere.

b. **Weight**. It has a **gross vehicle weight of 33,480 pounds**. The **armored cab** has a **weight of 7,000 pounds** which gives the TRAM a gross vehicle weight of 40,480 pounds when installed.

(ON SLIDE #11)

c. **Left Side**. View of the left side of the TRAM 624KR and labeling of major components:

- (1) Attachment Hoses
- (2) Return-to-Dig
- (3) Lift Chart
- (4) Hydraulic Fill
- (5) Coupler
- (6) Articulation Area
- (7) Articulation Lock
- (8) Boom Lock
- (9) Engine Compartment
- (10) Fuel Fill
- (11) Quad Cool

(ON SLIDE #12)

d. **Right Side**. View of the right side of the TRAM 624KR and labeling of major components:

- (1) Electric Load Center
- (2) Control Valve
- (3) Quad Cool
- (4) Storage Compartment
- (5) Battery Box
- (6) Articulation Area
- (7) Boom Sensor

(ON SLIDE #13)

e. **Engine**. It is powered by a John Deere, Model 6068, 6.8 Liter, turbocharged, 6 cylinder, direct injection diesel engine that produces **198 hp at 1800 RPM**.

(ON SLIDE #14)

f. **Left Engine Compartment**. View of left engine compartment and labeling of components:

- (1) Hydraulic Oil Sight Gauge
- (2) Washer Bottle
- (3) Hydraulic Oil Sample Valve
- (4) Maintenance Chart
- (5) Fuel Filters
- (6) Doser Filter
- (7) Engine Oil Filter
- (8) Fan Pump
- (9) Engine Oil Dipstick
- (10) Alternator
- (11) Air Filter

(ON SLIDE #15)

g. **Right Engine Compartment**. View of the right engine compartment and labeling of components:

- (1) Compressor Low Pressure Port
- (2) Engine Oil Sample Valve
- (3) Jump Start Terminal
- (4) Battery Disconnect
- (5) Glow Plug Relay

(ON SLIDE #16)

h. **Quad Cool**. View of Quad Cool and labeling of all components:

- (1) Coolant Recovery Bottle (**Coolant Check**)
- (2) Transmission Cooler
- (3) Fan Manifold
- (4) Radiator
- (5) Charge Air Cooler
- (6) Hydraulic Cooler
- (7) A/C Condenser

INSTRUCTOR NOTE

NOTE: Quad Cool gives maximum air flow to all coolers. Fan runs to the speed of the hottest cooler.

(ON SLIDE #17)

i. **Hydraulic Oil**. View of location of Hydraulic oil sight gauge. Hydraulic oil is same as engine, **15W-40**.

(ON SLIDE #18 & 19)

j. **Transmission**. The TRAM is equipped with a Powershift transmission, which has **four (4) gears forward** and **three (3) gears reverse**.

(1) The transmission speed is selected **manually** by the operator or can be selected in **automatic** 1-Drive or 2-Drive mode.

(2) The maximum forward speed is 24.5 MPH.

(3) The maximum reverse speed is 16.0 MPH.

NOTE:

Location of the Transmission hot check sight gauge and the transmission oil fill is located in the articulation area on the left side of the tractor.

(ON SLIDE #20)

k. **Differential**. The TRAM is equipped with a manual locking front differential and an open differential rear axle.

l. **Grade**. It can negotiate a maximum grade of **45%** with a full load fore and aft.

m. **Fording**. The maximum **fording depth is 60 inches** utilizing the **cooling fan lockout switch**.

(ON SLIDE #21 & 22)

n. **Axle**.

(1) The front axle is rigid mounted.

(2) The TRAM has an oscillating rear axle, which can oscillate 26 degrees left or right from center.

(3) The maximum ground clearance is 17.1 inches.

(ON SLIDE #23 & 24)

o. The TRAM is equipped with an **articulation locking bar**, which is utilized to **prevent accidental steering during transporting, or when performing maintenance.**

p. The TRAM is equipped with a **boom lock**, which is utilized to **prevent possible crushing injury from falling boom when performing maintenance.**

q. View of the location of the articulation locking bar and boom lock, located on the left side of the tractor in the articulation area.

(ON SLIDE #25)

r. **Electrical System.**

(1) The TRAM is equipped with a **24-volt negative ground electrical system.** The battery box is located on the left rear fender of the tractor.

(2) The TRAM is equipped with a **NATO slave receptacle;** located on the left side of the tractor above the rear tire.

(ON SLIDE #26)

s. **Brakes and Tires.**

(1) The TRAM is equipped with 4 wheel power actuated brakes.

(2) The tire pressure in for the TRAM tires is 76 psi.

(3) Explosive separation of a tire and rim parts can cause serious injury. **(SPLIT RIM)**

INSTRUCTOR NOTE

NOTE: When inflating tires, use a clip-on chuck and extension hose long enough to allow you to stand to one side and NOT in front of or over the tire assembly. Use a safety cage if available.

(ON SLIDE #27)

t. The tractor is equipped with a fully enclosed, pressurized cab and **Rollover Protective Structure (ROPS)** to protect the operator.

INSTRUCTOR NOTE

CAUTION: Use seatbelt when you operate with (ROPS) to minimize chance of injury from an accident such as an overturn.

(ON SLIDE #28)

2. MISSION: (5 min)

a. The mission of the TRAM 624KR, with the forks installed is to load and unload palletized and containerized cargo from trucks, trailers, ships, and aircraft.

b. The mission of the TRAM 624KR, with the bucket installed is to load haul units, and perform dozing, scraping, and clamshell operations.

(ON SLIDE #29)

TRANSITION: Are there any questions on the information we have just covered? If not than I have a few questions for you.

QUESTION 1: What is the gross weight of the TRAM? 33,480 pounds

QUESTION 2: What is the frame locking bar used for? To prevent accidental steering during maintenance and transporting.

(ON SLIDE #30)

(10-minute break)

3. INSTRUMENTS & CONTROLS: (50 Min)

The following section provides illustrations and detailed information about the TRAM 624KR's different instruments and controls.

(ON SLIDE #31)

a. **The Advance Display Unit (ADU)** is located in front and to the right of the operator on the cab support.

(1) Info button: This button is not used on this machine.

(2) Back button: Used to return to previous menu displayed.

(3) Select button: This button will activate the current menu function or make selections on individual submenu displays such as resetting job timer, starting and stopping stopwatch, and store settings.

(4) Down button: Used to move to the next selection within a menu or mode.

(5) Up button: Used to move to the previous selection with in a menu or mode.

INSTRUCTOR NOTE

Hour meter, odometer, and temperature reading share the same space on the display. Press the UP button on display to toggle between these items.

(6) Hour meter: Shows the accumulated hours that the engine has been running.

(7) Odometer: Shows the odometer reading in miles or kilometers to the nearest tenth.

(8) Ambient Temperature: Outside air temperature is shown in degrees C or F to the nearest degree.

(9) Actual gear and Travel direction: Shows whether transmission is in forward (F), neutral (N), or reverse (R). When transmission is in forward or reverse, the display also shows the actual gear currently engaged.

(10) Requested Gear: Shows the gear requested by the gear up and gear down buttons on the joystick control.

(11) Transmission Mode: Shows whether the transmission is in the AUTO 1-D mode, the AUTO 2-D mode, or MANUAL mode. Mode is selected by the automatic transmission switch on the switch module.

(12) Tachometer: Shows engine speed in revolutions per minute (RPM).

(13) Speedometer: Shows travel speed in miles per hour (mph) or kilometers per hour (km/h).

(14) Fuel Level Gauge: Shows the approximate level of fuel remaining in the tank. If the fuel level falls below 1/8 full, the indicator turns red. Always fill tank at the end of the day to prevent condensation in fuel tank.

(15) Engine Coolant Temperature Gauge: Indicator will light, STOP indicator will flash, and audible alarm will sound when pointer is in red zone. Stop machine and allow engine to cool. Shut off engine and take corrective action.

(16) Hydraulic Oil Temperature Gauge: Indicator will light and "Service required" indicator will light when pointer is in red zone. Stop work and cycle loader functions without load to lower oil temperature. If indicator remains in red zone, stop machine and notify a mechanic.

(17) Transmission Oil Temperature Gauge: Indicator will light, STOP indicator will flash, and audible alarm will sound when pointer is in red zone, indicating that oil temperature is too high. Stop machine and allow transmission to cool. Shut off engine and take corrective action.

(18) Engine Oil Pressure Gauge: Indicator will flash, STOP indicator will flash, and alarm will sound when engine oil pressure gauge indicates low pressure. Stop machine and SHUT OFF ENGINE IMMEDIATELY.

NOTE:

Prevent possible engine damage. If engine oil pressure icon flashes while operating, stop machine and SHUT OFF ENGINE IMMEDIATELY.

NOTE:

Extreme steep slope (off level) operation may cause indicator to light.

(19) Ride Control Indicator: Indicator will light when ride control function is active.

(20) Pin Disconnect Indicator: Indicator will light and alarm will sound every 10 seconds when disconnect switch is activated to retract cylinders for removal or installation of attachments.

(21) Check Engine Indicator: Indicator will flash when excessive water is present in final fuel filter or a fuel system failure has been detected. STOP indicator will flash, alarm will sound, and engine will derate to 50% of full power until water is drained.

(22) Transmission Fault Indicator: Indicator will light and "Service Required" indicator will light and stay on when a transmission clutch slippage service code has been detected.

(23) Low Battery Voltage Indicator: Indicator will light and "Service Required" indicator will light when battery voltage is below 24 volts with engine running or below 18 volts when engine is not running.

(24) Filter Restriction Indicator: Any of the following filter restrictions will cause the respective indicator to light in this space. "Service required" indicator will also light. If more than one filter restriction occurs at the same time, the indicators will alternate at 1 second intervals.

- Engine Air Filter Restriction
- Hydraulic Oil Filter Restriction
- Transmission Oil Filter Restriction
- Fuel Filter Restriction

NOTE:

Prevent possible damage to machine. Change filters as soon as possible when a problem occurs. Cold oil may cause hydraulic oil filter restriction indicator to light until oil is warm. Fuel filter indicator may come on during cold startups or when machine is under heavy loads. A flickering light is an early warning that fuel filter needs to be changed.

(25) Left Turn Indicator: Indicator will light when left turn signal switch or 4-way flashers switch is engaged.

(26) STOP Indicator: Indicator will light when a problem has developed. Stop machine immediately and determine cause of problem.

NOTE:

Prevent possible injury or machine damage. If STOP indicator flashes and alarm sounds, stop machine immediately and investigate cause of problem.

(27) Service Required Indicator (yellow): Indicator will light when a problem is developing. It is not necessary to stop the engine immediately, but the cause should be investigated as soon as possible.

(28) Park Brake Indicator: Indicator will light when park brake is engaged.

INSTRUCTOR NOTE

NOTE: If transmission is shifted out of neutral with engine running and park brake engaged, the STOP indicator will flash, Park Brake indicator will flash, and alarm will sound until park brake is disengaged or transmission is shifted back to neutral.

(29) Brake Pressure Indicator: Indicator will flash, STOP indicator will flash, and alarm will sound when brake oil pressure is low or brake accumulator has lost its charge. Stop machine immediately and engage park brake or shut off engine.

NOTE:

Prevent possible injury or machine damage. If brake pressure indicator comes on while operating, stop machine immediately.

(30) Right Turn Signal Indicator: Indicator will light when right turn signal switch or 4-way flashers switch is engaged.

(ON SLIDE #32)

b. Sealed Switch Module (SSM): Located to the right of the operator next to the auxiliary control lever.

(1) Engine Start Switch: This switch has three (3) positions:

(a) OFF

(b) Power On: Press and release switch until left LED is ON to energize the ignition and apply power to the control units and the display unit.

(c) Start Engine: After display unit has initialized, press and hold switch to start engine. Both LEDs are on when engine is cranking. Left LED is on when engine is running.

(2) Engine Stop Switch: Press and hold switch to shut off engine. If engine is already off, press switch to turn off ignition switch power.

(3) Beacon Light Switch: Not Equipped.

(4) Hazard Light Switch: Press and release switch until LED is on to turn on 4-way flashers. Press and release switch until LED is off to turn off 4-way flashers.

(5) Pilot Enable/ Boom Down Switch: The switch has three (3) positions:

(a) Boom Down: Press and hold switch while moving boom control lever forward to lower boom with engine off and ignition on.

(b) Unlock Pilot: Press and release switch until LED is on to unlock pilot controllers for normal operation (engine must be running).

(c) Lock Pilot: Press and release switch until LED is off to lock pilot controllers and disable hydraulic control levers.

(6) Park Brake Switch: Press switch to engage park brake. The LED on switch and indicator on display unit light to show that parking brake are on. Press and release switch to release park brake. LED on switch and indicator on display unit go off.

(7) Return-to-Dig Switch: This switch has three (3) positions:

(a) Return-to-Dig Activate: Press and release switch until one LED is on to activate return-to-dig.

(b) Not Used: Press and release switch until two LEDs are on. This setting is not currently used.

(c) Return-to-Dig Deactivate: Press and release switch until both LEDs are off to turn return-to-dig off.

(8) Automatic Transmission Switch: This switch has three (3) positions:

(a) AUTO 1-D: Press and release switch until left LED is on to engage transmission in AUTO 1-D (automatic) mode.

(b) AUTO 2-D: Press and release switch until both LEDs are on to engage transmission in AUTO 2-D mode.

(c) Manual: Press and release switch until both LEDs are off to engage transmission in MANUAL mode.

(9) Ride Control Switch: This switch has three (3) positions:

(a) On: Press and release switch until one (1) LED is on to turn on ride control ON (full time mode).

(b) AUTO: Press and release switch until two (2) LEDs are on to set ride control to the AUTO mode.

(c) OFF: Press and release switch until both LEDs are off to turn ride control OFF.

(10) Clutch Cutoff Switch: This switch has four (4) positions:

(a) Level Slope Setting: Press and release switch until one (1) LED is on to turn on level slope setting. On this setting the clutch releases with low brake pedal pressure.

(b) Small Slope Setting: Press and release switch until two (2) LEDs are on to turn on small slope setting. On this setting the clutch releases with medium brake pedal pressure.

(c) Steep Slope Setting: Press and release switch until three (3) LEDs are on to turn on steep slope setting. On this setting the clutch releases with high brake pressure.

(d) OFF: Press and release switch until all LEDs are off to disable clutch cutoff.

NOTE:

Prevent possible injury from unexpected machine movement. When stopping on inclines, press switch until no lights are illuminated to disable clutch cutoff before releasing brake pedal. This prevents the machine from rolling downhill during transmission re-engagement cycle. The park brake also disengages the transmission clutches

(11) Boom Height Kickout Switch: This switch has three (3) positions:

(a) Activate Boom Height Kickout: Press and release switch until one (1) LED is on to activate boom height kickout.

(b) Set Boom Height Kickout: While LED is on, kickout height can be reset as follows. Move boom to desired kickout height, then press and hold switch to reset kickout height. LED flashes and audible alarm sounds to indicate position has been set.

(c) Deactivate Boom Height Kickout: Press and release switch until LED is off to deactivate boom height kickout.

(12) Return-to-Carry Switch: This switch has three (3) positions:

(a) Activate Return-to-Carry: Press and release switch until one (1) LED is on to activate return-to-carry.

(b) Set Return-to-Carry Height: While LED is on, return-to-carry height can be reset as follows. Move boom to desired height, then press and hold switch to reset return-to-carry height. LED flashes and audible alarm sounds to indicate position has been set.

(c) Deactivate Return-to-Carry: Press and release switch until LED is off to deactivate return-to-carry.

(13) NOT USED

(14) NOT USED

(15) Pin Disconnect Switch: Press and hold switch for two (2) seconds to retract cylinders for removal of attachments. The LED remains on, pin disconnect indicator on the display unit lights, and the audible alarm sounds every ten (10) seconds.

Press and release switch until LED is off to extend cylinders for attachment.

(16) Air Conditioning Switch: Press and release switch until LED is on to turn on air conditioning. Press and release switch until LED is off to turn off air conditioning.

NOTE:

Engine must be running and blower fan speed switch must be on for air conditioning to function.

(17) Cooling Fan Lockout Switch: Press and release switch until LED is on to lockout operation of the cooling fan. Press and release switch until LED is off to return fan to normal operation.

NOTE:

Cooling Fan Lockout Switch is utilized in order to ford up to 60 inches.

(18) Front Washer Switch: Press switch to wash front window.

(19) Front Wiper Switch: This switch has four (4) positions:

(a) Intermittent: Press and release switch until one (1) LED is on for intermittent front wiper operation.

(b) Low: Press and release switch until two (2) LEDs are on for low speed front wiper operation.

(c) High: Press and release switch until three (3) LEDs are on for high speed front wiper operation.

(d) Off: Press and release switch until all LEDs are off to turn off front wipers.

(20) Drive and Marker Light Switch: This switch has three (3) positions:

(a) Marker Lights ON: Press and release switch until one (1) LED is on to turn on marker lights.

(b) Drive Lights ON: Press and release switch until two (2) LEDs are on to turn on drive lights and marker lights.

(c) OFF: Press and release switch until all LEDs are off to turn off drive lights and marker lights.

NOTE:

When marker or drive lights are turned on, the backlighting of the switch pad will turn on and the intensity of the lights will be decreased automatically for nighttime operation.

(21) Blackout Light Switch: Press and release switch until LED is on to activate blackout lighting. The following occurs: "All lights on outside of machine are turned off and disabled. Indicators on light switches on SSM go off. Backup alarm and horn are disabled." Blackout brake lights are controlled by the brake pedals. Blackout drive and marker lights are turned on. Press and release switch until LED is off to deactivate blackout lighting.

(22) NOT USED

(23) Rear Washer Switch: Press switch to wash rear window.

(24) Rear Wiper Switch: This switch has four (4) positions:

(a) Intermittent: Press and release switch until one (1) LED is on for intermittent rear wiper operation.

(b) Low: Press and release switch until two (2) LEDs are on for low speed rear wiper operation.

(c) High: Press and release switch until three (3) LEDs are on for high speed rear wiper operation.

(d) Off: Press and release switch until all LEDs are off to turn off rear wipers.

(25) Cab Work Light Switch: This switch has four (4) positions:

(a) Front Lights ON: Press and release switch until one (1) LED is on to turn on front lights.

(b) Front and Rear Lights ON: Press and release switch until two (2) LEDs are on to turn on front and rear lights.

(c) NOT USED

(d) OFF: Press and release switch until all LEDs are off to turn front and rear work lights off.

(ON SLIDE #33)

c. ADU and SSM simulator

INSTRUCTOR NOTE

NOTE: At this time open ADU and SSW simulator and cover how they are used.

(ON SLIDE #34)

(10-minute break)

(ON SLIDE #35)

d. **Transmission Switches**: Located on the eight (8) way joystick. Consists of four (4) different switches to control the transmission:

(1) **Forward, Neutral, Reverse (FNR) Switch**: Located on the front of the eight (8) way joystick. Press top of switch to shift to forward. Press switch to middle to shift to neutral. Press switch down to shift to reverse.

(2) **Decrease Gear button**: Located on the top of the eight (8) way joystick, bottom, left button. Press button to downshift to a lower gear.

(3) **Increase Gear button**: Located on the top of the eight (8) way joystick, top, right button. Press button to upshift to a higher gear.

(4) **Quick Shift button**: Located on the top of the eight (8) way joystick, top, left button. Consists of two (2) different modes that are programmed using the Settings menu of the ADU:

(a) **Down/Up Mode**: Press switch to downshift from selected gear to next lower gear when transmission is in gears 2-D. Press switch again to return to original gear.

(b) Down Only Mode: This mode will allow the transmission to downshift one gear each time the switch is pressed. Once a downshift is made by pressing the quick shift switch, the transmission will not shift up unless a direction change is made using forward, neutral, or reverse (FNR) switch or a gear change request is made by pressing Increase Gear Button.

(ON SLIDE #36)

d. Pedals:

(1) Differential Lock Switch: Press and hold switch down to lock front differential. Release switch to unlock differentials.

NOTE:

Use differential lock only when conditions require traction. Avoid using differential lock when steering.

(2) Brake Pedals: Depress right brake pedal or left brake pedal to stop machine.

NOTE:

Brake pedals also serve as clutch cutoff pedals when clutch cutoff switch is in "clutch disengaged" position. Do not engage while wheels are spinning.

(3) Steering Column Release Pedal: Depress pedal to release steering column and adjust column to desired tilt. Release pedal to lock column in position.

(4) Accelerator: Depress to increase speed of machine or to raise RPMs of engine.

(ON SLIDE #37)

e. Steering Column.

(1) Turn Signal Lever

(2) Horn

(ON SLIDE #38)

f. Boom and Bucket Control Lever

- (1) Lower Boom
- (2) Boom Float
- (3) Raise Boom
- (4) Boom Height Kickout
- (5) Dump Bucket
- (6) Fast Bucket Dump
- (7) Rollback Bucket
- (8) Return-to-Dig

(ON SLIDE #39)

g. Auxiliary Control Lever

(1) Increase Fork Tine Spacing/Open Clamshell: Push control lever forward.

(2) Decrease Fork Tine Spacing/Close Clamshell: Pull control lever to the rear.

(3) Side Shift Forks Left: Press right side of mode switch and hold while moving control lever forward.

(4) Side Shift Forks Right: Press right side of mode switch and hold while moving control lever to the rear.

(5) Fork Oscillation Left: Press left side of mode switch and hold while moving control lever forward.

(6) Fork Oscillation Right: Press left side of mode switch and hold while moving control lever to the rear.

(ON SLIDE #40)

TRANSITION: Are there any questions on the information we have just covered? If not than I have a few questions for you.

QUESTION 1: What does it mean if the light on the cooling fan lockout switch is on? The quad cool fan is off.

QUESTION 2: What are the 3 functions of the automatic transmission switch? Auto 1-D, Auto 2-D, Manual

4. BASIC OPERATIONS: (30 Min)

(ON SLIDE #41)

a. General Starting Procedures:

- (1) 360 walk around
- (2) Turn battery disconnect switch to ON.
- (3) Sit in operator's seat and fasten seat belt.
- (4) Move FNR Switch to N (neutral).

NOTE:

If engine is started with FNR switch in F (forward) or R (reverse), transmission will not shift into F or R until FNR switch is first moved to N (neutral).

(5) Press and release engine start switch. Observe display unit to see that park brake indicator is on.

NOTE:

Starting engine is a two-step process. First step applies power to control units and display unit. Second step applies power to starter motor.

(6) Press and hold engine start switch. **DO NOT crank engine more than 20 seconds. Wait 2 minutes before trying again.** Release switch when engine starts.

NOTE:

If STOP indicator light does not go out within 10 seconds after starting engine, STOP THE ENGINE. Find and correct the cause.

(7) Operate machine at less than normal loads and at slow idle speed until engine warms up.

(ON SLIDE #42)

b. General Stopping Procedures:

- (1) Park machine on a level surface.
- (2) Lower attachment to the ground.
- (3) Move Forward, Neutral, Reverse (FNR) switch to N (neutral).
- (4) Push park brake switch to ON.

(5) Run engine at 1/2 throttle without load for 2 minutes before stopping to avoid damage to turbocharger. Release accelerator pedal to slow idle.

NOTE:

Turbocharger may be damaged if engine is not properly shut down.

(6) Press engine stop switch to shut off engine.

(7) 360 walk around

(8) Turn Battery disconnect switch to OFF.

(ON SLIDE #43)

c. Engine-Out-of-Fuel

(1) Press the engine switch to the ON position.

(2) The Electric Transfer Pump will run automatically with the engine switch ON.

(3) The Electric Transfer Pump will first bleed air from the system.

(4) The pitch of the pump will change and fuel will be delivered to the filters, fuel rail and the rest of the system.

(5) Let the electric transfer pump run for approximately 1 minute before starting the engine.

(6) The engine is now ready to start.

NOTE:

DO NOT crack any fuel lines to bleed the fuel system. This fuel system is sensitive to fuel contamination. Fuel system is under high pressure and injury can result.

(ON SLIDE #44)

(7) Location of the Electric Transfer Pump in the left engine compartment of the tractor.

(ON SLIDE #45)

TRANSITION: Are there any questions on the information we have just covered? If not than I have a few questions for you.

QUESTION 1: What sends fuel back through the system if you run out of fuel? **Electric fuel pump.**

QUESTION 2: How is the max time you can use the engine start switch? **20 seconds with a break of two minutes between attempts.**

(ON SLIDE #46)

(10-minute break)

5. **ATTACHMENTS AND EMPLOYMENT.** (30 Min)

(ON SLIDE #47)

a. **Fork Attachment:**

(1) The TRAM can be equipped with either a **fork attachment** or a 4-in-1 hydraulically controlled 2 1/2 cubic yard, multipurpose bucket.

(a) **Forklift operations:** In a garrison or field environment, the TRAM can be used for loading and unloading trailers, Air Force pallets, aircraft, and ships.

(ON SLIDE #48)

(2) The forks are electrically, as well as hydraulically operated.

(3) The **maximum lifting capacity** of the TRAM, when equipped with the forks, is **10,000 pounds.**

(4) The **maximum lifting height**, of the TRAM, is **12 feet 2 inches** (measured from the bottom of the fork tines, to the deck).

(ON SLIDE #49)

(5) View of TRAM at its maximum lift height of 12 feet 2 inches.

(ON SLIDE #50)

(6) The fork carriage can side shift 12 inches, left or right from center.

(ON SLIDE #51)

(7) The fork tines can be adjusted for a maximum spread of 6 feet 4 inches (measured from the outside of the fork tines), and a minimum measurement of 18 inches (measured from the inside of the fork tines).

(ON SLIDE #52 & 53)

(8) The fork carriage can tilt forward 90 degrees, and 40 degrees to the rear.

(9) The fork carriage can oscillate 6.5 degrees left or right from center.

(ON SLIDE #54)

b. **Fork Employment:**

(1) Insure forks are square to the load when positioning to pick up or place a load.

(2) Use side shift control to align forklift if needed.

(3) Use oscillation when loads or haul unit are at an angle.

(ON SLIDE #55)

(4) Always carry a load against the fork carriage.

(5) Forks should be tilted back when carrying a stable load. Not all loads are to be considered stable, some loads need to be carried level.

(ON SLIDE #56)

(6) View of the correct carry height when carrying a load on the forks.

(ON SLIDE #57)

(7) Wide loads should be carried centered on the forks.

(8) When hauling bulky loads travel in reverse.

(9) When hauling a load up a steep grade travel forward with forks tilted back.

(10) When hauling a load down a steep grade travel in reverse with the forks tilted back.

(ON SLIDE #58)

(11) Never exceed the rated capacity of the forks.

(12) Never add extra counter weight.

(13). Never add fork extensions.

(ON SLIDE #59)

c. **The 4-in-1 bucket**: was designed to perform excavating and material handling operations.

(1) Bucket has a capacity of 2.5 cubic yards or 2500 pounds.

(2) The bucket has 4 different operating modes.

(a) Dozing

(b) Scraping

(c) Bucket

(d) Clamshell

(ON SLIDE #60)

(3) The return-to-dig capability is adjusted manually.

(4) The TRAM is equipped with an automatic leveling/return to carry, and an automatic boom height kick out device. They are set electrically using the SSM.

(ON SLIDE #61)

(5) View of where the return-to-dig adjustment is made on the tractor.

(ON SLIDE #62)

(6) DOZING:

- (a) Open clamshell all the way.
- (b) Raise or lower bucket for desired depth of cut.
- (c) For deep cut, tilt bucket forward.
- (d) For shallow cut, tilt bucket backward.

(ON SLIDE #63)

(7) View of the proper technique in dozing operations with the bucket.

(ON SLIDE #64)

(8) SCRAPING:

- (a) Partially open clamshell.
- (b) Load the bucket.
- (c) Tilt back at the same time close clamshell.

(ON SLIDE #65)

(9) View of the proper technique for scraping operations with the bucket.

(ON SLIDE #66)

(10) BUCKET:

- (a) Lower bucket to the ground.
- (b) Select 1st or 2nd gear depending on ground condition.
- (c) Move forward into the material.
- (d) Raise and curl bucket to hold load.

(ON SLIDE #67)

(11) View of the proper technique for bucket operations with the bucket.

(ON SLIDE #68)

(12) CLAMSHELL:

- (a) Open clamshell all the way.
- (b) Lower bucket to the ground.
- (c) Tilt bucket slightly forward.
- (d) Make contact with log.
- (e) Close clamshell then raise bucket to carry height.

(ON SLIDE #69)

(13) View of the proper technique for clamshell operations with the bucket.

d. Changing Attachments:

(ON SLIDE #70)

(1) Removal:

- (a) Lower attachment to the ground.
- (b) Shut OFF engine.
- (c) Press Pilot Enable/Boom Down Switch, then operate auxiliary control lever back and forth to relieve pressure in auxiliary hydraulic circuits.
- (d) Disconnect two hoses on attachment from hydraulic couplers. Connect couplers on hoses together install dust caps on couplers on loader.

INSTRUCTOR NOTE

DO NOT attempt to retract lock pins with attachment on the ground.

(ON SLIDE #71)

(e) Start engine.

(f) Raise boom until attachment is off the ground.

(g) Press pin disconnect switch. Bump the boom control lever until pins retract fully.

INSTRUCTOR NOTE

Caution: Unsupported fork attachment can tip backward and cause crushing injury. Always block fork securely when removing from machine.

(h) Lower the attachment to the ground. If removing forks, support rear of forks on blocks to prevent tipping backward.

(i) Slowly back up machine lifting pintle disengages from triangular alignment bar.

(ON SLIDE #72)

(2) **Installation:**

(a) Position loader so that the lifting pintle engages the triangular alignment bar on the attachment. Raise boom to support weight of attachment.

(b) Press and release pin disconnect switch. As the attachment begins to rise, the pins will align with holes in the attachment frame.

INSTRUCTOR NOTE

If both pins do not fully extend, raise and lower boom to jiggle pins into position.

(c) Press and release pin disconnect switch and allow pins to engage with attachment frame. Both pins must protrude approximately 10mm (0.375 in.) beyond the pin bosses.

(ON SLIDE #73)

(d) Lower attachment to the ground. Shut OFF engine.

(e) Press and hold Pilot Enable/Boom Down Switch while moving auxiliary control lever back and forth to relieve pressure in auxiliary hydraulic lines.

(f) Connect hoses on attachment to hydraulic couplers on loader.

(3) **Function Check.**

(ON SLIDE #74)

(a) Proper engagement of pin into pin boss.

(ON SLIDE #75)

(b) Pin retracted and tractor disengaged from attachment.

(ON SLIDE #76)

(c) Lifting pintle of tractor engaged into triangle alignment bar of attachment.

(ON SLIDE #77)

(d) Lifting pintle of tractor disengaged from triangle alignment bar of attachment.

(ON SLIDE #78)

(e) Attachment hoses attached to the tractor by the hydraulic quick disconnect couplers. Attachment electric connectors connected to tractor (Fork attachment ONLY).

(ON SLIDE #79)

(f) Hydraulic quick disconnect couplers and electric connector with dust covers installed.

(ON SLIDE #80)

TRANSITION. Are there any questions on the attachments or employment of the attachments for the TRAM? If there are no questions then I have a few for you.

QUESTION 1: What is the maximum capacity in cubic yards of the bucket? 2.5 cubic yards

QUESTION 2: What is the maximum lifting height of a TRAM equipped with a fork attachment? 12 feet 2 inches

(10-minute break)

INTERM TRANSITION: Before the break we covered in the classroom the major points on how to operate the TRAM; let's move on to the demonstration of a 360 walk around.

NOTE:

Ensure that all personnel are properly wearing the correct safety equipment when performing any type of PMCS.

INSTRUCTOR NOTE

Introduce Demonstration of 360 walk around

DEMONSTRATION. (25 Min) The purpose of this demonstration is to show the students how to perform before, during and after operational checks with the aid of a trip ticket. The demonstration also covers a 360 degrees walk around. Items required are a 624KR TRAM for the Instructor to use and students will have trip tickets and student handouts. Have the students gather around the 624KR TRAM for a demonstration of before, during and after operational checks and a 360 walk around. Normal class size is 12. There are two instructors required for this demonstration.

STUDENT ROLE: Students will observe the demonstration asking questions if they don't understand and also identify the checks with the trip ticket.

INSTRUCTOR(S) ROLE: Primary Instructor will demonstrate how to perform before, during and after operational checks with the aid of a trip ticket and a 360 walk around and the assistant

Instructor will assist the primary Instructor with the demonstration and any student questions.

1. Safety Brief: No safety concerns with this class.

2. Supervision and Guidance: Instructor will show the students the following items.

LEFT SIDE

Attachment Hoses
Return-to-Dig
Lift Chart
Hydraulic Fill
Coupler
Articulation Area
Articulation Lock
Boom Lock
Engine Compartment
Fuel Fill
Quad Cool
Hydraulic Oil Sight Gauge
Washer Bottle
Hydraulic Oil Sample Valve
Maintenance Chart
Fuel Filters
Doser Filter
Engine Oil Filter
Fan Pump
Engine Oil Dipstick
Alternator
Air Filter

RIGHT SIDE

Compressor Low Pressure Port
Engine Oil Sample Valve
Jump Start Terminal
Battery Disconnect
Glow Plug Relay
Electric Load Center
Control Valve
Quad Cool
Storage Compartment
Battery Box
Articulation Area
Boom Sensor
Coolant Recovery Bottle
Transmission Cooler
Fan Manifold
Radiator
Charge Air Cooler

Hydraulic Cooler
A/C Condenser

CAB

Advance Display Unit
Sealed Switch Module
Accelerator Pedal
Brake Pedals
Differential Lock Switch
Joystick Bucket and Boom Control
Forward, Neutral, or Reverse (FNR) Switch
Auxiliary Lever
Turn Signal Lever
Tilt Steering Column Adjust Lever
Seat Adjustments

3. Debrief: Answer any student questions and review the learning points.

INTERIM TRANSITION: We've just went over how to perform before, during and after operational checks with the aid of a trip ticket and a 360 walk around are there any questions? If not, let's move on to the practical application of a 360 walk around on the 624KR TRAM.

INSTRUCTOR NOTE

Introduce Practical Application of 360 walk around.

PRACTICAL APPLICATION. (2 Hrs) The purpose of this Practical Application is to allow the students to complete a 360 walk around on the 624KR TRAM. Items required are four 624KR TRAMS for the students. Normal class size is 12. The students are broken into groups of four and assigned a tractor with one student conducting a 360 walk around and the others observing. There are two instructors required for this demonstration.

PRACTICE: Students will perform the following checks.

LEFT SIDE

Attachment Hoses
Return-to-Dig
Lift Chart
Hydraulic Fill
Coupler

Articulation Area
Articulation Lock
Boom Lock
Engine Compartment
Fuel Fill
Quad Cool
Hydraulic Oil Sight Gauge
Washer Bottle
Hydraulic Oil Sample Valve
Maintenance Chart
Fuel Filters
Doser Filter
Engine Oil Filter
Fan Pump
Engine Oil Dipstick
Alternator
Air Filter

RIGHT SIDE

Compressor Low Pressure Port
Engine Oil Sample Valve
Jump Start Terminal
Battery Disconnect
Glow Plug Relay

Electric Load Center
Control Valve
Quad Cool
Storage Compartment
Battery Box
Articulation Area
Boom Sensor
Coolant Recovery Bottle
Transmission Cooler
Fan Manifold
Radiator
Charge Air Cooler
Hydraulic Cooler
A/C Condenser

CAB

Advance Display Unit
Sealed Switch Module
Accelerator Pedal
Brake Pedals
Differential Lock Switch
Joystick Bucket and Boom Control
Forward, Neutral, or Reverse (FNR) Switch

Auxiliary Lever
Turn Signal Lever
Tilt Steering Column Adjust Lever
Seat Adjustments

- 1. Safety Brief:** Reference the ORAW
- 2. Supervision and Guidance:** Instructor is moving around the site assisting students.
- 3. Debrief:** Answer any student questions and review the learning points.

INTERIM TRANSITION: We've just went over the practical application of conducting a 360 walk around on the 624KR TRAM, are there any questions? If not, let's move on to the demonstration of hand and arm signals.

INSTRUCTOR NOTE

Introduce Demonstration of hand and arm signals.

DEMONSTRATION. (15 Min) The purpose of this demonstration is to show the students how to use the correct hand and arm signals. Items required are student handouts for students to take any notes. Have the students gather around the Instructor for a demonstration of hand and arm signals. Normal class size is 12. There is one instructor required for this demonstration.

STUDENT ROLE: Students will observe the demonstration asking questions if they don't understand.

INSTRUCTOR(S) ROLE: Primary Instructor will demonstrate hand and arm signals.

- 1. Safety Brief:** Reference the ORAW
- 2. Supervision and Guidance:** Instructor will show the students the following items.
Hand and Arm Signals
- 3. Debrief:** Answer any student questions and review the learning points.

INTERIM TRANSITION: We've just went over how to perform hand and arm signals are there any questions? If not, let's move on to the practical application of hand and arm signals.

INSTRUCTOR NOTE

Introduce Practical Application of hand and arm signals

PRACTICAL APPLICATION. (2 Hrs) The purpose of this Practical Application is to allow the students to conduct hand and arm signals. No items are required. Normal class size is 12. The students are broken into groups of four and will conduct hand and arm signals. One instructor is required for this demonstration.

PRACTICE: Students will perform the following.
Hand and Arm Signals

- 1. Safety Brief:** Reference the ORAW
- 2. Supervision and Guidance:** Instructor is moving around the site assisting students.
- 3. Debrief:** Answer any student questions and review the learning points.

INTERIM TRANSITION: We've just went over the practical application of how to perform hand and arm signals are there any questions? If not, let's move on to the demonstration of how to operate a 624KR TRAM.

INSTRUCTOR NOTE

Introduce Demonstration of equipment operations

DEMONSTRATION. (40 Min) The purpose of this demonstration is to show the students how to operate the 624KR TRAM. Items required are a 624KR TRAM for the Instructor to use and students will have student handouts to take any notes. Issue hearing protection to students. Have the students gather around the 624KR TRAM for a demonstration of operations. Normal class size is 12. There are two instructors required for this demonstration.

STUDENT ROLE: Students will observe the demonstration asking questions if they don't understand.

INSTRUCTOR(S) ROLE: Primary Instructor will demonstrate operating the equipment and the assistant Instructor will assist

the primary Instructor with the demonstration and any student questions.

1. Safety Brief: Read ORAW and conduct safety brief

2. Supervision and Guidance: Instructor will show the students the following items.

Proper 360 walk around

3 points of contact entering tractor

Wear of safety belt

Proper Carry Height

Proper Fork insertion

Proper load lift and carry

Correct fork retraction

Proper load placement

Travel position

Operating in 1st gear differential lock engaged (when needed)

Full bucket of material

Proper dump position

Proper park line position

3. Debrief: Answer any student questions and review the learning points.

INTERIM TRANSITION: We've just went over the demonstration of operating the 624KR TRAM, are there any questions? If not, let's move on to the practical application.

INSTRUCTOR NOTE

Introduce Practical Application of equipment operations

PRACTICAL APPLICATION. (22 Hrs) The purpose of this Practical Application is to allow the students to operate the 624KR TRAM. Items required are four 624KR TRAMS for the students, hearing protection and radios. Normal class size is 12. The students are broken into groups of four and assigned a tractor with one student operating and the others observing. There are two instructors required for this demonstration.

PRACTICE: Students will perform the following.

Proper 360 walk around

3 points of contact entering tractor

Wear of safety belt

Proper Carry Height

Proper Fork insertion

Proper load lift and carry
Correct fork retraction
Proper load placement
Travel position
Operating in 1st gear differential lock engaged (when needed)
Full bucket of material
Proper dump position
Proper park line position

- 1. Safety Brief:** Reference the ORAW
- 2. Supervision and Guidance:** Instructor is moving around the site assisting students.
- 3. Debrief:** Answer any student questions and review the learning points.

INTERIM TRANSITION: We've just went over the practical application of operating the 624KR TRAM, are there any questions? If not, let's move on to the demonstration of changing the attachments.

INSTRUCTOR NOTE

Introduce Demonstration of changing attachments

DEMONSTRATION. (25 Min) The purpose of this demonstration is to show the students how to change the attachments. Items required are a 624KR TRAM for the Instructor to use and students will have student handouts to make any notes. Have the students gather around the 624KR TRAM for a demonstration of changing the attachments. Normal class size is 12. There are two instructors required for this demonstration.

STUDENT ROLE: Students will observe the demonstration asking questions if they don't understand.

INSTRUCTOR(S) ROLE: Primary Instructor will demonstrate changing the attachments. The assistant Instructor will assist the primary Instructor with the demonstration and any student questions.

- 1. Safety Brief:** Read ORAW
- 2. Supervision and Guidance:** Instructor will show the students the following items.
Procedures for changing the attachments

3. Debrief: Answer any student questions and review the learning points.

INTERIM TRANSITION: We've just went over the demonstration of changing the 624KR TRAM attachments, are there any questions? If not, let's move on to the practical application of changing the attachments.

PRACTICAL APPLICATION. (2 Hrs) The purpose of this practical application is to have the students demonstrate their ability to change the attachments. Items required are 4 624KR TRAMs for the students to use. Normal class size is 12. There are one to two instructors required for this practical application. Students will be broken into groups of two in which one students operates while the other ground guides.

PRACTICE: Students will perform the following.
Change applicable attachments

PROVIDE-HELP: Instructor will have checklist to ensure students are completing all steps required for safe operation, ready to go over at the conclusion of Prac Ap.

- 1. Safety Brief:** Reference the ORAW
- 2. Supervision and Guidance:** Instructor is moving around the site assisting students.
- 3. Debrief:** Answer any student questions and review the learning points.

INTERIM TRANSITION: We've just went over the demonstration of changing attachments, are there any questions? If not, let's move on to the demonstration of conducting PMCS.

INSTRUCTOR NOTE

Introduce demo of conducting PMCS

DEMONSTRATION. (15 Min) Have the students gather around the 624KR TRAM for a demonstration of conducting PMCS. Normal class size is 12. There are two instructors required for this demonstration.

STUDENT ROLE: Students will observe the demonstration asking questions if they don't understand.

INSTRUCTOR(S) ROLE: Primary Instructor will demonstrate proper PMCS and the assistant Instructor will assist the primary Instructor with the demonstration and any student questions.

1. Safety Brief: Read ORAW

2. Supervision and Guidance: Instructor will show the students the following items.

Check fluids

Clean air filters

Grease points

Tire pressure

3. Debrief: Answer any student questions and review the learning points.

INTERIM TRANSITION: We've just completed the required steps for proper PMCS, are there any questions? If not, let's move on to the practical application of the PMCS.

INSTRUCTOR NOTE

Introduce practical application of conducting PMCS

PRACTICAL APPLICATION. (2 Hrs) The purpose of this Practical Application is to allow the students to conduct PMCS. Items required are all 624KR TRAMS on hand for the students, hearing protection, safety glasses and PMCS worksheets. Have the students break into groups of two's. Normal class size is 12. There are two instructors required for this practical application.

PRACTICE: Students will work the practical application checking for and correcting all discrepancies and complete the PMCS worksheet.

PROVIDE-HELP: N/A

1. Safety Brief: N/A

2. Supervision and Guidance: Instructor is moving around the ready line, assisting students, and answering questions as they arise.

Instructors Note

Answer all questions then go into the summary.

TRANSITION: We've just completed the practical application for proper PMCS, are there any questions? If there are no questions let's move into the classroom to go over what we have covered this week.

SUMMARY

(5 MIN)

This week we have covered various topics dealing with the TRAM. Specifically, we have covered the mission, general characteristic, major components, instruments and controls and operations. Make sure all IRFs are given to the Instructor. This concludes this period of instruction take a **10 minute break.**