

TRAINING PROGRAM FOR
THE HEAVY EXPANDED MOBILITY TACTICAL TRUCK (HEMTT)

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HEADQUARTERS, DEPARTMENT OF THE ARMY

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EXPANDED MOBILITY TACTICAL TRUCK (HEMTT)

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PREFACE

This TC provides a training program for the HEMTT operator according to AR 600-55. It provides standardized training and testing in the operation, maintenance, and safety of the HEMTT. It stresses hands-on training with minimal classroom instruction and does not include any theater-unique requirements.

During the development of this TC, it was assumed that each driver candidate would have a state driver's license and have extensive experience driving a 5-ton or larger tactical cargo truck. The reason for this is because of the cab configuration of the HEMTT, the instructor cannot control the behind-the-wheel actions of the driver. Additional training for less experienced drivers is contained in TC 21-305-8.

The lesson content for this training program is arranged sequentially and separated into three chapters (Chapters 4, 6, and 7). Chapter 4 contains training for driving operations and Chapter 7 for MHC and SRW operations. Testing for HEMTT operators is in Chapter 6. Only after passing all required testing, are operators trained in MHC/SRW operations in Chapter 7. This allows the commander the flexibility to tailor HEMTT training based on the unit's equipment.

To provide effective training, each instructor should ensure his operators are trained and tested to the standards in this TC. Any deviation from the successful completion of these basic standards will only lessen the soldiers' overall driving effectiveness.

Graduates of this training program (licensed drivers) should be supervised until they have gained the experience to operate the HEMTT safely. They should not be placed in situations that may be above their skill level. Periodically, the supervisor should ride with each driver to observe safe operating procedures and to determine the need for additional training.

The proponent of this publication is the US Army Transportation School. Submit changes for improving this publication on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forward it to Commandant, US Army Transportation School, ATTN: ATSP-TDX, Fort Eustis, Virginia 23604-5389.

The US Army's environmental strategy into the 21st century defines the Army's leadership commitment and philosophy for meeting present and future environmental challenges. It provides a framework to ensure that environmental stewardship ethic governs all Army activities. The Army's environmental vision is to be a national leader in environmental and natural resource stewardship for present and future generations, as an integral part of all Army missions. The Army's environmental vision statement communicates the Army's commitment to the environment.

Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

1-1. BACKGROUND. Ground vehicle accidents cost the Army about \$100 million each year and significantly reduces mission capabilities. Leaders must develop techniques that will save resources. Because the Army must be prepared to operate worldwide, the training mission has become increasingly demanding and so have the risks inherent in that mission. This increase in risk requires leaders to balance mission needs with hazards involved and make wise risk decisions.

1-2. DEFINITION. Risk is the possibility of a loss combined with the probability of an occurrence. The loss can be death, injury, property damage, or mission failure. Risk management identifies risks associated with a particular operation and weighs these risks against the overall training value to be gained. The four rules of risk management are as follows:

- o Accept no unnecessary risk.
- o Accept risks when benefits outweigh costs.
- o Make risk decisions at the right command level.
- o Manage risk in the concept and planning stages whenever possible.

1-3. RISK MANAGEMENT PROCESS. The risk management process uses the following approach:

- a. Identify Hazards. Look for hazards in each phase of the training or operation.
- b. Assess the Risk. Ask these questions:
 - o What type of injury or equipment damage can be expected?
 - o What is the probability of an accident happening?

NOTE: A low probability of an accident and an expected minor injury equals low risk. A high probability of an accident and an expected fatality equals extremely high risk.

c. Develop Risk Control Alternatives and Make Risk Decisions. If you cannot eliminate the risk, then you must control it without sacrificing essential mission requirements. You can control some risks by modifying tasks, changing location, increasing supervision, wearing protective clothing, changing time of operation, and so forth. Decisions take several forms:

- o Selecting from available controls.
- o Modifying the mission because the risk is too great.
- o Accepting risk because mission benefits outweigh potential loss.

d. Implement Risk Control Measures. You must integrate procedures to control risks into plans, orders, SOPs, and training. You must also ensure risk reduction measures are used during actual operations.

e. Supervise the Operations. Make sure leaders know what controls are in place and what standards are expected. Then hold those in charge, accountable for implementation. This is the point when accident prevention actually happens.

1-4. **RISK ASSESSMENT ELEMENTS.** There are no hard and fast rules for assessing risk. Different training tasks involve different elements that can affect training safety. However, the following seven elements are central to safely completing most driver training tasks:

- o Soldier qualification.
- o Supervision.
- o Vehicle type.
- o Equipment.
- o Weather.
- o Time of day.
- o Terrain.

Using matrices that assign a risk level to each of the elements is one way to quickly appreciate the overall risks. The following matrices are examples of risk assessments for the seven elements common to driver training missions.

NOTE: These are arbitrarily weighted factors. Modify them based on your particular mission and unit.

a. Measure soldier qualification risk by comparing the level of task difficulty to the soldier’s military driving experience.

SOLDIER QUALIFICATION RISK VALUE			
TASK	DRIVING EXPERIENCE		
	LICENSED OVER 1 YEAR	LICENSED UNDER 1 YEAR	UNLICENSED
COMPLEX	Medium	High	High
ROUTINE	Low	Medium	High
SIMPLE	Low	Low	Medium

EXAMPLE: Unlicensed drivers learning downhill braking techniques in a HEMTT would be a high risk situation requiring substantial controls.

b. Measure vehicle type risk by comparing the vehicle configuration to the locations of the training tasks.

VEHICLE TYPE RISK VALUE			
LOCATION OF TRAINING	VEHICLE CONFIGURATION		
	SMALL TRUCKS	STRAIGHT TRUCKS	COMBINATION UNITS
ROAD TRAINING AREA	Medium	High	High
MOTOR POOL	Low	Medium	High
	Low	Low	Low

EXAMPLE: Driving a HEMTT over the road would have a high risk value.

c. Measure weather risk by comparing road conditions with visibility.

WEATHER RISK VALUE			
ROAD CONDITIONS	VISIBILITY		
	CLEAR	REDUCED	RESTRICTED
UNFAVORABLE	Medium	High	High
ADEQUATE	Low	Medium	High
FAVORABLE	Low	Medium	High

EXAMPLE: Driving on icy roads in fog would have a high risk value.

d. Measure terrain risk by comparing the physical features of the land with the existing road network.

TERRAIN RISK VALUE			
TYPE OF TERRAIN	ROAD NETWORK		
	IMPROVED ROADS	SECONDARY ROADS	UNIMPROVED
MOUNTAIN	Medium	High	High
DESERT/JUNGLE	Low	Medium	High
FLAT/ROLLING	Low	Low	Medium

EXAMPLE: Driver training conducted at Fort Bragg, over trails, would have a medium risk value.

e. Measure supervision risk by comparing the level of supervision to the task location.

SUPERVISION RISK VALUE			
LEVEL OF SUPERVISION	TASK LOCATION		
	MOTOR POOL	TRAINING AREA/ UNCONGESTED ROAD	OFF ROAD/ CONGESTED ROAD
NOT OBSERVING	High	High	High
OBSERVING	Low	Medium	High
IN VEHICLE	Low	Low	Medium

EXAMPLE: A student driving alone, but observed, in a training area would have a medium risk value.

f. Measure equipment risk by comparing the equipment’s age to the time (months) since the last semiannual service. Equipment age is defined as the following: old is 15 or more years old; average is 5 to 15 years old; and new is 5 or less years old.

EQUIPMENT RISK VALUE			
EQUIPMENT AGE	LAST SEMIANNUAL SERVICE		
	0 to 2 months	+2 to 4 months	+4 months
OLD	Medium	Medium	High
AVERAGE	Low	Medium	High
NEW	Low	Low	Medium

EXAMPLE: An eight-year-old HEMTT serviced 3 months ago would have a medium risk value.

g. Measure time of day risk by comparing the level of light to familiarity with the route.

TIME OF DAY RISK VALUE			
ROUTE FAMILIARITY	LIGHT LEVEL		
	DAY	DAWN/DUSK	NIGHT
NEVER DRIVEN ROUTE	Medium	High	High
DRIVEN ROUTE 1 TO 3 TIMES	Low	Medium	High
FAMILIAR ROUTE	Low	Low	Medium

EXAMPLE: A driving task over a familiar route that starts during the day but ends at dusk would have a medium risk value.

h. After assessing all the risks, the overall risk value equals the highest risk identified for any one element. Now is the time to focus on high risk elements and develop controls to reduce risks to an acceptable level. Control examples may include conducting training in a different location or at a different time of day, putting an instructor in the vehicle with the student, waiting for better weather, using a different vehicle, and so on.

1-5. **DECISION AID.** The level of the decision maker should correspond to the level of the risk. The greater the risk, the more senior the final decision maker should be. This matrix is a proposed decision aid to help determine the leadership decision-making level.

DECISION AID	
RISK	DECISION LEVEL
LOW	SENIOR INSTRUCTOR
MEDIUM	COMPANY COMMANDER
HIGH	BATTALION COMMANDER

a. Medium risk training warrants complete unit command involvement. For example, a medium risk value in the weather element category indicates the soldiers are more susceptible to cold injuries and require closer supervision or a rescheduling of training. If you cannot reduce the risk level, the company commander should decide to train or defer the mission.

b. Operations with a high risk value warrant battalion involvement. If you cannot reduce the risk level, the battalion commander should decide to train or defer the mission.

1-6. **RISK CONTROL ALTERNATIVES.** The following options can help control risk:

- a. Eliminate the hazard totally, if possible, or substitute a less hazardous alternative.
- b. Reduce the magnitude of the hazard by changing tasks, locations, times, and so forth.
- c. Modify operational procedures to minimize risk exposure consistent with mission needs.
- d. Train and motivate personnel to perform to standards to avoid hazards.

1-7. **SUPERVISION.** Leaders must monitor the training to ensure risk control measures are followed. Never underestimate subordinates' ability to sidetrack a decision they do not understand or support. You must also monitor the impact of risk reduction procedures when they are implemented to see that they really work. This is especially true of new, untested procedures.

1-8. **PAYOFFS.** Risk management lets you use realistic training scenarios minimizing personnel and equipment losses while training. Risk management is consistent with METT-T decision processes and can be used in battle to increase mission effectiveness.

SAMPLE RISK ASSESSMENT WORK SHEET FOR DRIVER TRAINING

TRAINING TASK: _____

RISK LEVEL: _____

_____ 1. SOLDIER QUALIFICATION

TASK	DRIVING EXPERIENCE		
	LICENSED OVER 1 YEAR	LICENSED UNDER 1 YEAR	UNLICENSED
COMPLEX	Medium	High	High
ROUTINE	Low	Medium	High
SIMPLE	Low	Low	Medium

_____ 2. VEHICLE TYPE

LOCATION OF TRAINING	VEHICLE CONFIGURATION		
	SMALL TRUCKS	STRAIGHT TRUCKS	COMBINATION UNITS
ROAD	Medium	High	High
TRAINING AREA	Low	Medium	High
MOTOR POOL	Low	Low	Low

_____ 3. WEATHER

ROAD CONDITIONS	VISIBILITY		
	CLEAR	REDUCED	RESTRICTED
UNFAVORABLE	Medium	High	High
ADEQUATE	Low	Medium	High
FAVORABLE	Low	Medium	High

_____ 4. TERRAIN

TYPE OF TERRAIN	ROAD NETWORK		
	IMPROVED ROADS	SECONDARY ROADS	UNIMPROVED
MOUNTAIN	Medium	High	High
DESERT/JUNGLE	Low	Medium	High
FLAT/ROLLING	Low	Low	Medium

_____ 5. SUPERVISION

LEVEL OF SUPERVISION	TASK LOCATION		
	MOTOR POOL	TRAINING AREA/ UNCONGESTED ROAD	OFF ROAD/ CONGESTED ROAD
NOT OBSERVING	High	High	High
OBSERVING	Low	Medium	High
IN VEHICLE	Low	Low	Medium

_____ 6. EQUIPMENT

EQUIPMENT AGE	LAST SEMIANNUAL SERVICE		
	0 to 2 months	+2 to 4 months	+4 months
OLD	Medium	Medium	High
AVERAGE	Low	Medium	High
NEW	Low	Low	Medium

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_____ 7. TIME OF DAY

ROUTE FAMILIARITY	LIGHT LEVEL		
	DAY	DAWN/DUSK	NIGHT
NEVER DRIVEN ROUTE	Medium	High	High
DRIVEN ROUTE 1 TO 3 TIMES	Low	Medium	High
FAMILIAR ROUTE	Low	Low	Medium

_____ OVERALL RISK LEVEL											
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DECISION AID</th> </tr> <tr> <th>RISK</th> <th>DECISION LEVEL</th> </tr> </thead> <tbody> <tr> <td>LOW</td> <td>SENIOR INSTRUCTOR</td> </tr> <tr> <td>MEDIUM</td> <td>COMPANY COMMANDER</td> </tr> <tr> <td>HIGH</td> <td>BATTALION COMMANDER</td> </tr> </tbody> </table>		DECISION AID		RISK	DECISION LEVEL	LOW	SENIOR INSTRUCTOR	MEDIUM	COMPANY COMMANDER	HIGH	BATTALION COMMANDER
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RISK	DECISION LEVEL										
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MEDIUM	COMPANY COMMANDER										
HIGH	BATTALION COMMANDER										

APPROVED BY: _____ DATE: _____

CHAPTER 2
INSTRUCTIONAL AIDS

2-1. STUDENT REQUIREMENTS.

a. Vehicles Per Student. Vehicle to student ratio is contained in the instructional material and varies from 1:1 to 1:2.

b. Forms Per Student.

DD Form 1970. Motor Equipment Utilization Record.

DA Form 2404. Equipment Inspection and Maintenance Worksheet.

c. Publications Per Student.

TM 9-2320-279-10-1. Operator's Manual, Volume No. 1 for M977 Series, 8X8 Heavy Expanded Mobility Tactical Trucks (HEMTT).

LO 9-2320-279-12. M977 Series, 8X8 Heavy Expanded Mobility Tactical Trucks (HEMTT).

d. Nonstandard Items.

Forty empty POL drums, traffic cones, or locally fabricated standards.

Locally constructed anchors for winch operations.

Work gloves.

Load for M977 HEMTT.

Load for M978 HEMTT.

Load for HEMTT crane.

2-2. INSTRUCTOR REQUIREMENTS.

One each of the above forms.

One each of the above publications.

AR 385-55. Prevention of Motor Vehicle Accidents.

AR 600-55. The Army Driver and Operator Standardization Program (Selection, Training, Testing, and Licensing).

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DA Pamphlet 738-750. Functional Users Manual for the Army Maintenance Management System (TAMMS).

FM 20-22. Vehicle Recovery Operations.

FM 21-305. Manual for the Wheeled Vehicle Driver.

FM 21-60. Visual Signals.

All host nation or local directives and regulations.

2-3. TRAINING FACILITIES.

Classroom.

Motor pool.

Training area(s).

Suitable road network for driver training (primary, secondary, and off road).

2-4. TRAINING AIDS AND DEVICES.

Overhead projector.

Projection screen.

Transparencies (paper copies included in Appendix A).

Television monitor.

Videocassette player.

TVT 55-23. HEMTT PMCS. 1992. (PIN: 709710DA).

TVT 55-24. HEMTT Winch Operations. 1992. (PIN: 709711DA).

TVT 55-25. HEMTT Crane Operations. 1992. (PIN: 709712DA).

TVT 55-26. HEMTT Driving Techniques. 1992. (PIN: 709713DA).

CHAPTER 3

SAMPLE TRAINING SCHEDULE

<u>WHEN</u>	<u>WHAT</u>	<u>WHERE</u>	<u>TASK NUMBER</u>
DAY 1			
0730-0830	Identify Major Components, Cab Controls, Instruments, and Indicators	Classroom	551-721-1352
0830-0900	Know Engine Start and Shut Off Procedures	Classroom	551-721-1366
0900-0930	Operate Engine Brake (Jake Brake)	Classroom	551-721-1366
0930-1130	Perform Operator Preventive Maintenance Checks and Services (PMCS)	Classroom/ Motor Pool	551-721-1352
1130-1230	Lunch		
1230-1600	Drive an M977/M978 HEMTT	Classroom/ Training Area	551-721-1366
1600-1630	Perform After-Operation PMCS	Motor Pool	551-721-1352
<hr/>			
DAY 2			
0730-0800	Perform Before-Operation PMCS	Motor Pool	551-721-1352
0800-1130	Drive an M977/M978 HEMTT	Training Area	551-721-1366
1130-1230	Lunch		
1230-1600	Drive the HEMTT on the Road (Primary and Secondary)	Motor Pool/ Driver Training Route	551-721-1366
1600-1630	Perform After-Operation PMCS	Motor Pool	551-721-1352

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<u>WHEN</u>	<u>WHAT</u>	<u>WHERE</u>	<u>TASK NUMBER</u>
DAY 3			
0730-0800	Perform Before-Operation PMCS	Motor Pool	551-721-1352
0800-1130	Drive the HEMTT on the Road (Primary and Secondary)	Driver Training Route	551-721-1366
1130-1230	Lunch		
1230-1600	Drive the HEMTT on the Road (Primary and Secondary) (continued)	Driver Training Route	551-721-1366
1600-1630	Perform After-Operation PMCS	Motor Pool	551-721-1352

DAY 4

0730-0800	Drive an M977/M978 HEMTT Off Road	Classroom	551-721-1360
0800-0830	Perform Before-Operation PMCS	Motor Pool	551-721-1352
0830-1130	Drive an M977/M978 HEMTT Off Road (continued)	Off Road Driver Training Area	551-721-1360
1130-1230	Lunch		
1230-1400	Drive an M977/M978 HEMTT Off Road (continued)	Off Road Driver Training Area	551-721-1360
1400-1430	Perform After-Operation PMCS	Motor Pool	551-721-1352
1900-1930	Perform Before-Operation PMCS	Motor Pool	551-721-1352

<u>WHEN</u>	<u>WHAT</u>	<u>WHERE</u>	<u>TASK NUMBER</u>
DAY 4 (continued)			
1930-2330	Drive the HEMTT at Night	Motor Pool/ Training Area/ Driver Training Route	551-721-1366
2330-2400	Perform After-Operation PMCS	Motor Pool	551-721-1352
DAY 5			
1230-1630	Change Tire on HEMTT Using Tire Davit	Motor Pool or Training Area	551-721-1352
DAY 6			
0730-0800	Perform Before-Operation PMCS	Motor Pool	551-721-1352
0800-1130	Drive the HEMTT on the Road (Primary and Secondary)	Driver Training Route	551-721-1366
1100-1130	Perform After-Operation PMCS	Motor Pool	551-721-1352
1130-1230	Lunch		
1230-1630	End of Course Comprehensive Test and Perform After-Operation PMCS	Classroom/ Motor Pool/ Test Route Motor Pool	All Tasks 551-721-1352

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MHC/SRW OPERATIONS
DAY 7

NOTE: Day 7 is scheduled for training when units are assigned HEMTT vehicles equipped with material handling crane and/or self recovery winch.

<u>WHEN</u>	<u>WHAT</u>	<u>WHERE</u>	<u>TASK NUMBER</u>
0730-1130	Operate an M977 HEMTT Crane	Classroom/ Training Area	551-721-1407 551-721-1352
1130-1230	Lunch		
1230-1630	Perform Self Recovery on an M977/M978 HEMTT Using the Winch	Classroom/ Training Area	551-721-1390 551-721-1352

NOTE: If students have not mastered MHC/SRW operations in the scheduled time, additional time may be added.

CHAPTER 4

LESSON OUTLINES FOR DRIVING OPERATIONS

LESSON TITLE: IDENTIFY MAJOR COMPONENTS, CAB CONTROLS, INSTRUMENTS, AND INDICATORS

TASK NUMBER: 551-721-1352 (Perform Vehicle Preventive Maintenance Checks and Services [PMCS])

A. TRAINING OBJECTIVE.

TASK: Identify major components, cab controls, instruments, and indicators.

CONDITION: Given instruction on the M977/M978 HEMTT and a requirement to identify and explain the functions of major components, cab controls, instruments, and indicators.

STANDARDS: Correctly identify and explain the functions of major components, cab controls, instruments, and indicators.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. Training time: As scheduled.
2. Training location: Scheduled classroom.
3. Training type: Conference.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor.
6. Training aids and equipment: Overhead projector, screen, and transparencies.
7. References: TM 9-2320-279-10-1.

D. SEQUENCE OF ACTIVITY.

1. Introduction:
 - a. Interest device.
 - b. Tie-in.
 - c. Lesson objective (paragraph A).
 - d. Procedures:
 - (1) Explanation.
 - (2) Summary.

2. Explanation:

NOTE: The instructor will emphasize the importance of the safety of getting into and out of the cab (maintain three points of contact), observing all warnings, and using seat belts.

Transparency HEMTT 1-1

a. Major components (all models).

- (1) Personnel cab. Provides protection from the weather for the crew and the vehicle controls, gauges, and indicators.
- (2) Engine compartment. Engine supplies power to move the vehicle and operate the equipment and accessories.
- (3) Ether canister. Contains ether for use as cold weather starting aid.
- (4) Air cleaner. Filters out dust and debris from air entering the air induction system.
- (5) Tire davit (shown assembled). Used to raise and lower the spare tire.
- (6) Hydraulic reservoir. Stores, cools, and filters the oil used in the hydraulic and power steering systems.
- (7) Fuel tank. Stores fuel used to operate the engine. Receives excess fuel not used by the engine's fuel injection system.
- (8) No. 3 driving axle. Supports weight of the vehicle and transmits power to the hubs to turn the rear wheels.
- (9) No. 4 driving axle. Supports weight of the vehicle and transmits power to the hubs to turn the rear wheels.

Transparency HEMTT 1-2

- (10) Tire davit (shown in stowed position). Used to raise and lower the spare tire.
- (11) Air dryer. Used to remove dirt and moisture from compressed air before air enters the air reservoirs.
- (12) Fuel-water separator. Acts as the primary fuel filter and removes any water from the fuel before entering the engine.
- (13) Battery box. Houses and protects the four storage batteries.
- (14) No. 1 driving axle. Controls the direction of the vehicle when in motion. When needed, transmits power to the hubs to turn the wheels (8X8 drive).
- (15) No. 2 driving axle. Controls the direction of the vehicle when in motion. When needed, transmits power to the hubs to turn the wheels (8X8 drive).

(16) Air reservoirs. Used to store the air system air.

(17) Self recovery winch (installed on approximately 20 percent of the HEMTT fleet). Used to help the vehicle pull itself free of obstructions.

Transparency HEMTT 1-3

b. Major components (M977).

(1) Stowage boxes. Used to stow BII.

(2) Access ladder. Used by the operator to clean windows, check oil, or perform other tasks requiring access to parts of the vehicle out of normal reach.

(3) Cargo body. Used to carry palletized ammunition. Tiedowns are provided to allow the ammunition pallets to be tied down.

(4) Material handling crane. Used to load and unload cargo.

Transparency HEMTT 1-4

c. Major components (M978).

(1) Stowage box. Used to stow fuel cans or fuel hoses.

(2) Tank. Stores up to 2,500 gallons of automotive, diesel, or jet fuel.

(3) Stowage box. Used to stow BII.

(4) Tank access ladder (shown in stowed position). Provides access to the top of the tank.

(5) Pump module. Contains the fuel servicing controls, indicators, and connections.

(6) Access ladder. Used by the operator to clean windows, check oil, or perform other tasks requiring access to parts of the vehicle out of normal reach.

(7) Stowage compartment. Used to stow the 3-inch suction hose assembly.

(8) Chock stowage box. Used to stow the wooden wheel chocks.

(9) Dipstick stowage tube. Used to stow the tank dipstick.

Transparency HEMTT 1-5

d. Foot controls and lower window.

(1) Headlight dimmer switch. Press switch to raise or lower headlight beams. High beam indicator will light up red when high beams are on.

(2) Service brake pedal. Applies the service brakes. When towing a trailer, if vehicle is properly coupled to the trailer, the trailer service brakes will also operate when vehicle service brakes are applied.

- (3) Accelerator pedal. Controls the engine and vehicle speed.
- (4) Floor window. This is for over-crest visibility (enables the driver to see what is on the down side of a crest). Also, the metal horizontal bar across the center of the window is 48 inches, the maximum fording depth of the HEMTT.

Transparency HEMTT 1-6

- e. Cab mounted hand controls.
 - (1) Cab door window glass regulator (one on each door). Raises and lowers the window glass.
 - (2) Air horn chain. Pull down to sound the air horn. Let go to silence the air horn.
 - (3) Cab door inside release handle (one on each door). Pull to open the cab door from inside the cab.
 - (4) Cab door handle (one on each door). Pull to close the cab door from inside the cab.

Transparency HEMTT 1-7

- f. Steering column mounted controls.
 - (1) Emergency flasher control. For the hazard warning flashers (4-way) to operate, the light switch must be in the stop light or service drive position. To turn on the hazard warning flashers, move the turn signal lever to the right turn position, press the hazard tab down, and push the turn signal lever up as far as it will go. To turn the hazard warning flashers off, push the turn signal lever down to the center position.
 - (2) Steering wheel. This is used to control the direction of the vehicle. Grasp the steering wheel on opposite sides (such as the 3 o'clock and 9 o'clock positions) with your palms facing inward.
 - (3) Horn button. It sounds the electric horn when pressed.
 - (4) Turn signal lever. Push up to signal a right turn and pull down to signal a left turn. When the turn is completed, manually return the lever to the center position (turn signal will not self-cancel).

Transparency HEMTT 1-8

- g. Tunnel panel controls.
 - (1) Transmission range selector. Used to select the transmission range. The transmission can be shifted manually to control the vehicle speed.
 - (a) Use R to move the vehicle backwards.
 - (b) Use N to start the engine, park the vehicle, shift the transfer case, and operate auxiliary equipment (crane, winch, and/or tanker pump).

- (c) Use D to drive in normal conditions and move forward from a stop. The transmission will up shift and down shift automatically.
 - (d) Use 3 (third range) to drive in off-road conditions, drive in city traffic, and haul a heavy load. Restricts up shifts to no higher than 3rd gear.
 - (e) Use 2 (second range) when pulling through mud or snow and climbing or descending moderate grades. Restricts up shifts to no higher than 2d gear.
 - (f) Use 1 (first range) when greatest traction and maximum engine braking is needed, such as driving through deep mud or snow and climbing or descending steep grades.
- (2) Selector detent button. Must be pushed in to move the transmission range selector.
 - (3) STE/ICE receptacle. Receptacle for connecting simplified test equipment/internal combustion engine.
 - (4) Transfer case shift lever. Used to select HI range or LO range. Center position is N.

NOTE: The trick to shifting the transfer is to stop the truck, take your right hand and apply pressure to the transfer case shift lever, while at the same time you shift the transmission range selector to N with your left hand. Do not force the transfer case shift lever as this will only cause damage to the shift collars. The collars must be aligned before the transfer case will go into gear. If the transfer case shift lever is hard to move, shift the transmission range selector to D, then back to N. If the transfer case will not shift, select R then N and try to shift the transfer case lever again. If the transfer case will still not shift, select D, then back to N.

- (a) Set the transfer case shift lever to HI range for highway driving and secondary roads.
 - (b) Set the transfer case shift lever to LO range for adverse off-road driving and steep grades.
- (5) Self recovery winch lever (if equipped with winch). Used to pay out and take up winch cable. Center position is N.

Transparency HEMTT 1-9

h. Instrument panel controls and indicators.

- (1) Parking brake control. Push in to release the vehicle brakes and pull to apply the vehicle brakes. It also automatically applies the parking brakes if air pressure goes below 35 PSI (spring brakes).
- (2) Left turn indicator. Flashes green when the left turn signal is on.
- (3) Speedometer/odometer. Shows the vehicle traveling speed in MPH and KPH and the total miles traveled.

- (4) High beam indicator. Lights up red when the vehicle headlights are on high beam.
- (5) Tachometer/hourmeter. Shows the engine operating speed RPM X 100 and the total operating time in hours.
- (6) Right turn indicator. Flashes green when the right turn signal is on.
- (7) Fuel gauge. Shows the amount of fuel in the fuel tank.
- (8) Transmission temperature gauge. Shows the transmission fluid temperature in degrees F and degrees C.
- (9) Oil pressure gauge. Shows the engine oil pressure in PSI and kPa.
- (10) Water temperature gauge. Shows the engine coolant temperature in degrees F and degrees C.

Transparency HEMTT 1-10

- (11) Oil-water indicator. Lights up red when the engine oil pressure is too low or when the engine coolant temperature is too high.
- (12) INTER-AXLE DIFF. LOCK indicator. Lights up red when the traction control is in the INTER-AXLE DIFF. LOCK position.
- (13) 8X8 drive indicator. Lights up orange when the traction control is in the 8X8 drive position or when the transfer case is in low (low also puts vehicle in 8X8 drive).
- (14) Air filter restriction indicator. Shows condition of the air cleaner filter. Indicator window shows green when the filter is clean; yellow as filter becomes restricted; and red when the filter becomes clogged. Vacuum inches H₂O window shows degree of restriction.
- (15) Traction control. In left position (INTER-AXLE DIFF. LOCK) locks interaxles in front and rear tandems. In right position (8X8 drive) engages transfer case drive to front axle.
- (16) Ether start control. Injects ether into engine intake manifold for cold weather starting.

Transparency HEMTT 1-11

- (17) Engine stop switch. Used to stop the engine. It is a spring activated toggle switch that returns to the run position when released.
- (18) Engine start switch. Three position switch. Straight up is the off position. On position operates the electrical system. Start position operates the engine cranking circuit. When switch is released after the engine starts, the switch will return to the on position.
- (19) Air indicator. Lights up red and will remain lit until the airbrake air pressure in each section of the dual system is between 55 and 75 PSI. The buzzer

will sound whenever the indicator is lit.

(20) Air pressure gauge. Shows the air pressure (in PSI and kPa) in both sections of the airbrake system. The green needle shows the front section air pressure. The red needle shows the rear section air pressure.

(21) Battery gauge. Shows the state of charge of the batteries and the alternator voltage output.

(22) Amperes gauge. Shows the alternator output in amperes.

(23) Trailer air supply control. Charges the trailer airbrake system.

Transparency HEMTT 1-12

i. Heater compartment controls and indicators.

(1) Trailer handbrake control (johnson bar or trailer hand valve). Is used to apply and release the trailer brakes separate from the vehicle service brakes. It should only be used to test the trailer brakes. Using it when driving will cause the trailer to skid. It can be used for coupling and uncoupling trailers without spring brakes.

(2) Jacobs engine brake on-off switch. Supplies or shuts off electrical power to the Jacobs engine brake.

(3) Jacobs engine brake indicator. Lights up green when the Jacobs engine brake on-off switch is in the on position.

(4) Jacobs engine brake high-low switch. Selects the number of engine cylinders used for engine braking action. The high position provides maximum braking (8 cylinders). The low position provides less engine braking (4 cylinders).

(5) Air control. Controls the amount of outside air entering the cab through the fresh air vent.

(6) Fan control. Controls the speed of the heater fan.

(7) Heat control. Controls the amount of hot air entering the cab.

(8) Defrost control. Controls the amount of hot air blown on the windshield.

(9) PTO engage indicator. Lights up red when the PTO engage control is in the on position.

(10) Crane outrigger extended indicator. Lights up red when the outriggers are extended (M977).

(11) PTO engage control. Supplies or shuts off electrical power to the power takeoff.

(12) Utility outlet. Supplies electrical power to operate the beacon light.

(13) Light control. Controls all electrical power to all parts of the vehicle.

- (14) Washer control. Controls spray of cleaning fluid on the windshield.
- (15) Wiper control (right). Controls operation of the right windshield wiper.
- (16) Wiper control (left). Controls operation of the left windshield wiper.
- (17) Work light switch (NA). M977/M978 not equipped with work lights.
- (18) Domelight switch. Up position turns the cab domelight on. Down position turns the cab domelight off.
- (19) Clearance lamps switch. Up position turns clearance lamps on. Down position turns the clearance lamps off.

Transparency HEMTT 1-13

- j. Operator and crew seat adjustment controls.

NOTE: Controls on both seats are the same.

- (1) Seat belt. Secures personnel in seat.
- (2) Seat connector strap. Secures seat to cab frame.
- (3) Height adjustment control. Use to adjust the seat height.
- (4) Forward/backward adjustment control. Use to move the seat forward and backward on slides.
- (5) Ride adjustment control. Use to adjust the seat tension and ride firmness.

3. Practical exercise: None.

4. Evaluate: Students are evaluated daily during driving tasks and are tested during the EOCCT.

5. Summary:

- a. Recap main points.
- b. Allow for questions.
- c. Clarify questions.
- d. Give closing statement.

6. Retraining: Training is reinforced during daily driving tasks.

E. SAFETY RESTRICTIONS. None.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 1 hour (conference).

LESSON TITLE: KNOW ENGINE START AND SHUT OFF PROCEDURES

TASK NUMBER: 551-721-1366 (Drive Vehicle with Automatic Transmission)

A. TRAINING OBJECTIVE.

TASK: Know engine start and shut off procedures.

CONDITION: Given instruction on the M977/M978 HEMTT and a requirement to locate the controls and explain the engine start and shut off procedures.

STANDARDS: Correctly locate the controls and explain the engine start and shut off procedures.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. Training time: As scheduled.
2. Training location: Scheduled classroom.
3. Training type: Conference.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor.
6. Training aids and equipment: Overhead projector, screen, and transparencies.
7. References: TM 9-2320-279-10-1.

D. SEQUENCE OF ACTIVITY.

1. Introduction:
 - a. Interest device.
 - b. Tie-in.
 - c. Lesson objective (paragraph A).
 - d. Procedures:
 - (1) Explanation.
 - (2) Summary.

2. Explanation:

NOTE: This lesson will emphasize correct engine start and shut off techniques to be used with the HEMTT. The instructor will review special cautions which will increase vehicle and component longevity.

Transparency HEMTT 2-1

a. Engine start.

- (1) Ensure parking brake control [1] is pulled out.
- (2) Ensure transmission range lever [2] is set to N.

CAUTION

Do not press the ether start button more than three times in a single starting attempt. Failure to observe this caution could cause severe engine damage.

- (3) To use the ether start button [3] press for three seconds, wait three seconds more before using it again or turning the engine switch to start. If outside temperature is above 45 degrees F, go to step 4. Press ether start button as indicated below:

- (a) One time for temperatures between +10 degrees F to +45 degrees F.
- (b) Two times for temperatures between -10 degrees F to +10 degrees F.
- (c) Three times for temperatures between -10 degrees F to -25 degrees F.

Transparency HEMTT 2-2

CAUTION

Do not turn the engine start switch to the start position while the engine is running. Engine or starter damage could result.

- (4) Turn the engine switch [4] to start for about 10 seconds or until the engine starts. If the vehicle fails to start, wait 15 seconds before next attempt to allow starter to cool. Release the switch. The switch will spring back to the on position. The air pressure indicator [5] may light and buzzer may sound.

NOTE: Repeat steps 3 and 4 up to seven times. If the engine fails to start after eight starting attempts, notify organizational maintenance.

CAUTION

If the oil pressure gauge does not show engine oil pressure within 10 to 15 seconds after starting the engine, shut down immediately. Notify organizational maintenance. Lack of lubrication may damage the engine.

CAUTION

Do not operate the engine above 1,000 RPM during warm up until the oil pressure gauge indicates 40 to 60 PSI at 800 to 1,000 RPM. Lack of lubrication may damage the engine.

- (5) Check that oil pressure gauge [6] reads 5 to 10 PSI or more at idle.

Transparency HEMTT 2-3

- (6) Press accelerator pedal [7] until tachometer [8] indicates 800 to 1,000 RPM.

- (7) Run engine at 800 to 1,000 RPM for about 3 minutes.
- (8) Check that oil pressure gauge reads 40 to 60 PSI at 800 to 1,000 RPM. A cold engine may read above 30 PSI while a hot engine may read as low as 5 PSI at idle.

NOTE: If the red and green needles on the air pressure gauge do not read 60 to 120 PSI after warm-up, shut off the engine and notify organizational maintenance.

- (9) Check that air pressure gauge [9] reads 60 to 120 PSI. The air pressure indicator [5] will light up and buzzer will sound until both needles reach 60 to 75 PSI. The minimum air pressure required during operation is 100 PSI.

Transparency HEMTT 2-4

- (10) Check that fuel gauge [10] shows enough fuel to complete the mission.
- (11) Check that water temperature gauge [11] does not read over 230 degrees F.

NOTE: The water temperature gauge may not show a reading until after extensive operation.

- (12) Check that battery gauge [12] reads between 24 and 28 volts.
- (13) Check that amperes gauge [13] shows a positive reading.
- (14) Check that air filter restriction indicator [14] shows green. If the indicator shows yellow or red, press the reset button [15]. If the indicator still shows yellow and vacuum inches H₂O window shows 18 or indicator still shows red, shut off the engine and clean the air filter elements.

Transparency HEMTT 2-5

b. Engine shut off.

- (1) Bring the vehicle to a complete stop.
- (2) Apply the parking brake. Pull to apply.
- (3) Shift the transmission to N.
- (4) Run the engine [2] at 800 to 1,000 RPM for 3 to 5 minutes. This continues oil circulation to cool turbocharger, which is turning at about 67,000 RPM.
- (5) Idle the engine for 30 seconds.
- (6) Shut off all accessories to include lights.
- (7) Hold the engine stop switch [3] all the way down until the engine shuts down. Buzzer will sound and oil-water indicator [4] will light up.
- (8) Let go of the engine stop switch [3].
- (9) Turn the engine switch to off [5]. Buzzer and oil-water indicator [4] will go off.

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3. Practical exercise: None.
4. Evaluate: Students are evaluated daily during driving tasks and are tested during the EOCCT.
5. Summary:
 - a. Recap main points.
 - b. Allow for questions.
 - c. Clarify questions.
 - d. Give closing statement.
6. Retraining: Training is reinforced during daily driving tasks.

E. SAFETY RESTRICTIONS. None.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 0.5 hours (conference).

LESSON TITLE: OPERATE ENGINE BRAKE (JAKE BRAKE)

TASK NUMBER: 551-721-1366 (Drive Vehicle with Automatic Transmission)

A. TRAINING OBJECTIVE.

TASK: Operate the engine brake.

CONDITION: Given instruction on the M977/M978 HEMTT and a requirement to locate the controls and explain the operation of the engine brake.

STANDARDS: Correctly locate the controls and explain the operation of the engine brake.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. Training time: As scheduled.
2. Training location: Scheduled classroom.
3. Training type: Conference.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor.
6. Training aids and equipment: Overhead projector, screen, and transparencies.
7. References: TM 9-2320-279-10-1.

D. SEQUENCE OF ACTIVITY.

1. Introduction:
 - a. Interest device.
 - b. Tie-in.
 - c. Lesson objective (paragraph A).
 - d. Procedures:
 - (1) Explanation.
 - (2) Summary.

2. Explanation:

Transparency HEMTT 3-1

- a. How the engine brake (Jake brake) works. The principle behind the engine brake is very simple. It is a hydraulically operated device that converts a power-producing diesel engine into a power-absorbing retarding mechanism. In order to understand how the

engine brake provides its strong retarding power, compare the engine cycles with and without an engine brake. For this purpose, the illustrations pertain to a four-cycle engine. However, the engine brake is effective on both 2- and 4-cycle diesels.

(1) During the intake stroke:

(a) Without engine brake [1]: The intake valve is opened and air is pulled into the cylinder.

(b) With engine brake [1A]: Same as above.

(2) During the compression stroke:

(a) Without engine brake [2]: Air is compressed to between 500 and 1,000 PSI and heat rises to about 1,000 degrees F. Fuel is injected and combustion occurs. This results in a pressure rise to some 1,500 PSI with a corresponding increase in temperature.

(b) With engine brake [2A]: Air is compressed with corresponding increases in pressure and temperature. Near top dead center, the engine brake's slave piston opens the exhaust valve and the compressed air mass (representing potential energy) is released through the exhaust system. (Note black arrows in illustrations [2A] and [3A]). No combustion occurs since the engine brake operates only when the engine is in a no fuel (foot completely off accelerator) mode.

(3) During the power stroke:

(a) Without engine brake [3]: The high pressure resulting from the combustion of the fuel/air mixture forces the piston down, imparting power to the drivetrain.

(b) With engine brake [3A]: No positive power is produced since the compressed air mass was released via the exhaust system during the modified compression stroke. The energy required to return the piston to its bottom position is now derived from the momentum of the vehicle. It is this 2-step process--elimination of the compressed air and use of vehicle momentum to move the piston--which develops the engine brake's retarding capabilities.

(4) During the exhaust stroke:

(a) Without engine brake [4]: Upward motion of the piston forces exhaust gases out of the cylinder.

(b) With engine brake [4A]: Any remaining air is forced out of the cylinder.

Transparency HEMTT 3-2

(5) Discuss the system briefly. There are three basic controls:

(a) The engine brake high/low switch [1]. Selects the number of engine cylinders used for braking. High position provides maximum

braking (all eight cylinders). Low position provides less engine braking (four cylinders).

(b) The engine brake on/off switch [2]. Supplies or shuts off electrical power to the engine brake.

(c) Accelerator pedal [3]. This is the activation switch. Automatically pre-selected to cut in when foot is taken off accelerator pedal (no fuel position).

b. Location of control and how to operate. The engine must be warmed prior to using or checking the operation of the engine brake. The reason for this is that the engine brake uses engine oil to operate. The oil must be warm enough to flow through the tiny orifices and valves that cause the engine brake to operate.

(1) The engine brake high/low switch [1] has two positions, low and high. Set the switch to low.

(2) Set the engine brake on/off switch [2] to on. The engine brake indicator light [4] will come on.

(3) Lift foot off the accelerator pedal [3]. The engine brake will automatically slow the vehicle.

(4) Optimum braking occurs with engine speed between 1,650 and 2,100 RPM [7]. Select appropriate transmission range [6] and engine brake [1] setting to maintain desired effect. Do not over rev engine during braking.

(5) If more braking is required, set the engine brake high/low switch [1] to high.

WARNING

Apply the engine brake only when the vehicle tires have good traction. Use of the engine brake on slick surfaces can cause the vehicle to skid and cause injury or death.

NOTE: Service (wheel) brakes must be used in addition to the engine brake for maximum braking. The engine brake is a supplement to the service brakes. The engine brake is a vehicle slowing device, not a vehicle stopping device.

Transparency HEMTT 3-3

c. Guidelines for use of engine brake. In some areas (cities and municipalities) it is illegal to use the engine brake. This is because of the exhaust noise when the engine brake is used. Check local laws and regulations before using the engine brake.

(1) Do not use the engine brake until the engine has warmed.

(2) Select the proper transmission gear to keep engine speed high, but not beyond governed speed (1,650 to 2,100 RPM).

(3) Always be aware of the engine brake high/low switch and on/off switch positions.

(4) Use the proper brake position for existing road conditions.

(5) Get acquainted with the braking feel to make the best use of the system.

(6) The gear used going upgrade is usually good for going down.

(7) Always shut the on/off switch off after use.

3. Practical exercise: None.

4. Evaluate: Students are evaluated daily during driving tasks and are tested during the EOCCT.

5. Summary:

a. Recap main points.

b. Allow for questions.

c. Clarify questions.

d. Give closing statement.

6. Retraining: Training is reinforced during daily driving tasks.

E. SAFETY RESTRICTIONS. None.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 0.5 hours (conference).

ENGINE BRAKE (JAKE BRAKE) INFORMATION SHEET

1. Each M977/M978 HEMTT is equipped with a retarder system that enables the engine to act as a brake. The engine brake should be used for descending grades or in any situation where slowing is required but not on slippery road surfaces (such as rain, snow, sleet, or ice). Using the engine brake on slippery surfaces can cause the vehicle to skid. The engine brake is most effective between 1,650 to 2,100 RPM.
2. Never allow the engine speed to drop below 1,650 RPM with the engine brake applied. This will cause serious transmission damage.

CAUTION

The engine brake loses effectiveness in controlling engine RPM and vehicle speed when being pushed by a load down a grade. Use service brakes and manually downshift range selector as necessary on long grades to keep vehicle speed under control and engine speed between 1,650 to 2,100 RPM.

3. The following procedures should be followed when the vehicle tires have good traction:
 - a. Select a gear that will allow the engine, with the engine brake applied, to control the truck speed with the engine at or below 2,100 RPM and service brakes not applied. This means as you approach a downgrade, progressively select a gear; which when combined with the engine brake, will allow you to maintain an engine speed of 1,650 to 2,100 RPM.
 - b. As engine speed exceeds 2,100 RPM, apply the service brakes one time to slow the engine speed, turn off the engine brake, downshift one gear (if you are in D, you would downshift to 3 and reapply the engine brake). Repeat this procedure until the engine speed can be maintained between 1,650 to 2,100 RPM.
 - c. If the engine over speeds (above 2,100 RPM) apply the service brakes one time to slow the vehicle speed and regain control.

WARNING

Failure to follow the downhill driving procedures may cause you to lose vehicle control and result in severe injury or death to personnel.

CAUTION

Excessive use of the service brake to control downhill speed will result in the loss of braking power because of heat buildup.

WARNING

Rapid operation repeatedly of service brakes will consume compressed air supply and cause automatic spring brake application. Failure to follow proper service brake operating procedures may cause serious injury or death to personnel.

4. The instructor must emphasize and reemphasize the importance of the proper downhill braking procedures and the use of the engine brake, especially on slippery surfaces, as outlined above. He must instill in the drivers that if these procedures are not followed, death or serious injury can result.
5. Also, the instructor must explain to the students that braking ability and braking techniques are different with a loaded vehicle and the driver must think and plan ahead. The driver must increase his following distance and reduce his speed consistent with road and traffic conditions.

LESSON TITLE: PERFORM OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

TASK NUMBER: 551-721-1352 (Perform Vehicle Preventive Maintenance Checks and Services [PMCS]).

A. TRAINING OBJECTIVE.

TASK: Perform operator PMCS on the HEMTT vehicle.

CONDITION: Given instruction, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, lubricants, coolant, and a HEMTT vehicle with BII.

STANDARDS: Inspect the vehicle according to the PMCS tables listed in TM 9-2320-279-10-1. Correct all faults within the operator's level of maintenance and record all others legibly on DA Form 2404. If no faults are found, make the necessary entries on DA Form 2404.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. Training time: As scheduled.
2. Training location: Classroom and motor pool as scheduled.
3. Training type: Conference, demonstration, and practical exercise.
4. Students: Scheduled personnel.

5. Principal and assistant instructors required: One primary instructor for the conference, one assistant instructor for each two students for the demonstration, and one assistant instructor for each two students for the practical exercise.

6. Training aids and equipment: Television, VCR, TVT 55-23, hearing protection, rags, lubricants, coolant, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, and a HEMTT vehicle with BII for each two students.

7. References: AR 385-55, DA Pamphlet 738-750, and TM 9-2320-279-10-1.

D. SEQUENCE OF ACTIVITY.

1. Introduction:
 - a. Interest device.
 - b. Tie-in.
 - c. Lesson objective (paragraph A).
 - d. Procedures:
 - (1) Explanation.

(2) Practical exercise.

(3) Summary.

2. Explanation and demonstration:

a. Show TVT 55-23.

b. Demonstrate before-, during-, and after-operation PMCS to students.

3. Practical exercise:

a. Assign students to vehicles and issue TM 9-2320-279-10-1, pencils, DA Form 2404, and equipment records folder. Tell students where rags, lubricants, and coolant are located.

b. Students perform PMCS.

4. Evaluate: Check each student's performance of PMCS.

5. Summary:

a. Recap main points.

b. Allow for questions.

c. Clarify questions.

d. Closing statement.

6. Retraining: Students perform PMCS daily and is reinforced throughout the course. PMCS is tested on the EOCCT.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when vehicles are parked or maintenance is to be performed.

2. Ensure the transmission is in N, the parking brake is set, and the engine is shut off before leaving the vehicle, when the vehicle is parked, or maintenance is being performed.

3. Ensure all personnel remove all wristwatches, rings, bracelets, neck chains, and any other jewelry before working in or around the HEMTT.

4. Ensure all personnel pay particular attention to the cautions and warnings listed in the operator's manuals.

5. Ensure the driver and ground guides know and understand the hand and arm signals, especially the signal to stop, as outlined in FM 21-305.

6. Ensure ground guide(s) are used when backing.

7. Ensure all backing is conducted at a speed of 5 MPH or less.

8. Do not park the vehicle on a steep grade. Serious injury or death can result or the vent on the M978 tanker may leak.
9. Ensure all personnel wear hearing protection when working in or around a running HEMTT.
10. Ensure all occupants wear seat belts while the vehicle is in operation.
11. Ensure personnel maintain at least three points of contact when mounting or dismounting the vehicle (to include performing PMCS).
12. The vehicle access ladder must be used when performing maintenance. The two hooks on the ladder must be installed in the front skid plate holes, right front fender holes, or left front fender holes as required. When installing or removing the access ladder to or from the right front fender holes, do not hit the fuel-water separator. Hitting the fuel-water separator could cause the glass to break.
13. The vehicle access ladder must be used to mount or dismount the HEMTT cargo body. Install the access ladder in the right front fender holes, climb the ladder, and step into the cargo bed from the right fender.
14. Ensure all personnel are clear of vehicle before engine start is attempted. Operator must visually check to see that all areas of the truck are clear of personnel before attempting to start the engine. Failure to do so could result in serious injury or death to personnel.
15. The radiator is very hot and pressurized during vehicle operation. Let the radiator cool before removing the cap. Failure to comply can result in serious burns.
16. The exhaust pipe and muffler can become very hot during vehicle operation. Be careful not to touch these parts with bare hands or allow the body to come in contact with the exhaust pipe or muffler. Exhaust system parts can become hot enough to cause serious burns.
17. Be careful not to short out battery terminals. Do not smoke or use open flame near batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes.
18. Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep a fire extinguisher within easy reach when working with fuel. Do not work on the fuel system when the engine is hot. Fuel can be ignited by the hot engine. When working with fuel, post signs that read: "NO SMOKING WITHIN 50 FEET OF VEHICLE."

F. **ADDITIONAL COMMENTS AND INFORMATION.** Recommended instructional time is 2 hours (.25 conference, .75 demonstration, and 1.0 practical exercise). The remaining PMCS is performed throughout the course in conjunction with driving tasks.

TC 21-305-1

LESSON TITLE: DRIVE AN M977/M978 HEMTT

TASK NUMBER: 551-721-1366 (Drive Vehicle with Automatic Transmission)

A. TRAINING OBJECTIVE.

TASK: Drive an M977/M978 HEMTT.

CONDITION: Given instruction, DD Form 1970, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, lubricants, coolant, a suitable driver training area, an M977/M978 HEMTT with BII, and a requirement to drive the HEMTT; start the vehicle, put the vehicle in motion, read gauges, upshift and downshift the transmission, manipulate the controls, use correct braking procedures, perform basic driving maneuvers to include backing using ground guides, and shut off the engine.

STANDARDS: Drive the vehicle correctly and safely without accident or injury.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. Training time: As scheduled.

2. Training location: Classroom, motor park, and training area as scheduled.

3. Training type: Conference, demonstration, and practical exercise.

4. Students: Scheduled personnel.

5. Principal and assistant instructors required: One primary instructor for the conference, one assistant instructor for the demonstration, and one assistant instructor for each student for the practical exercise.

6. Training aids and equipment: Television, VCR, TVT 55-26, rags, lubricants, coolant, 40 traffic cones or empty POL drums, DA Form 2404, DD Form 1970, pencil, TM 9-2320-279-10-1, equipment records folder, and an M977/M978 HEMTT with BII for each student.

7. References: AR 385-55, DA Pamphlet 738-750, FM 21-305, and TM 9-2320-279-10-1.

D. SEQUENCE OF ACTIVITY.

1. Introduction:

a. Interest device.

b. Tie-in.

c. Lesson objective (paragraph A).

d. Procedures:

(1) Explanation.

(2) Practical exercise.

(3) Summary.

2. Explanation and demonstration:

NOTE: An instructor will be in the cab whenever a student is driving the HEMTT.

a. Show TVT 55-26.

b. Place vehicle in motion:

(1) Perform before-operation PMCS.

(2) Remove and stow wheel chocks (stowed under spare tire).

(3) For M977 vehicles:

(a) Make sure cargo box end and side panels are in place and secure.

(b) Make sure load, if present, is loaded correctly and tied down to prevent movement.

(c) Make sure MHC and outriggers are secured in their stowed position.

(4) For M978 vehicles:

(a) Make sure manhole cover is closed and latched.

(b) Make sure pump module doors are closed and latched.

(c) Make sure tank access ladder is secured in the stowed position.

(5) Adjust each rear view mirror so back of truck and view of road can be seen.

(6) Install foot rest if required.

(7) Adjust seat as needed.

(8) Adjust seat belt as needed.

WARNING

Ensure all personnel are clear of truck before engine start is attempted. Operator must visually check to see that all areas of the truck are clear of personnel before attempting to start the engine. Failure to do so could result in serious injury or death to personnel.

(9) Start engine and allow it to warm up.

(10) Check all gauges and instruments. Ensure that they are registering normal readings.

(11) Turn on lights as appropriate.

CAUTION

Do not move the transfer case shift lever when the vehicle is moving or when the transmission is in gear. This can cause severe damage to the driveline.

- (12) Set the transfer case shift lever to the appropriate range.
- (13) Apply the service brake, push in the button on the transmission range selector, and move the transmission range selector to the appropriate range (D, 3, 2, or 1).
- (14) Push in the parking brake control to release the brakes.
- (15) Release the service brake pedal and slowly press the accelerator pedal until the vehicle reaches the desired speed.
- (16) Accelerate, brake, and steer as required.

CAUTION

Do not hold the steering wheel at the full left or right position for longer than 10 seconds. Power steering oil overheating and pump damage can result.

- (17) Manually downshift the transmission range selector to match driving conditions.

c. Stop the truck.

- (1) Release the accelerator pedal.
- (2) Depress the brake pedal.

WARNING

Apply brakes gradually when stopping. A panic stop will cause the vehicle wheels to lock, engine to stall, and power steering failure. Failure to do this can result in injury or death.

WARNING

Rapid operation repeatedly of service brakes will consume compressed air supply and cause automatic spring brake application. Failure to follow proper service brake operating procedures may cause serious injury or death to personnel.

- (3) As the vehicle begins to reduce speed, decrease brake pedal pressure.
- (4) Stop smoothly by releasing the brake pedal pressure gradually as the stopping rate increases.
- (5) After stopping, apply the brake just enough to keep the truck stopped.

d. Backing the truck. Since the driver cannot see directly behind his vehicle, backing is always a dangerous maneuver. Common sense therefore dictates that backing be avoided whenever possible. For example, if the vehicle must be parked, the driver parks so that he will be able to pull forward when leaving. Even though planning ahead can reduce the need to back, almost everyone who drives will have to back on occasion.

These four simple rules will help in backing safely:

- (1) Inspect your intended path.
- (2) Back and turn toward the driver's side.
- (3) Use four-way flashers and horn.
- (4) Use ground guide(s).

WARNING

When backing or going forward, ground guides should never stand directly in the vehicle's path. Keep 10 yards between the vehicle and ground guides at the front or rear and at the corners of the vehicle (never directly behind the vehicle). Ground guides must not position themselves between the vehicle being guided and another object where an inadvertent engine surge or momentary loss of vehicle control could cause injury. The vehicle driver will immediately stop the vehicle if he loses sight of ground guides or notes that the guide is dangerously positioned between the vehicle and another object. In such cases, the vehicle driver will secure his vehicle, dismount, and make an on-the-spot correction before commencing operations.

- e. Park the truck and shut down the engine.

WARNING

Do not park the truck on a steep grade. Serious personal injury can result or the vent on the M978 tanker may leak.

- (1) Align the front tires in a straight ahead position.
- (2) Pull out the parking brake control.
- (3) Push in the button on the transmission range selector and move the transmission range selector to N.
- (4) Chock wheels (for proper placement see chapter 8, FM 21-305).
- (5) Increase engine speed to 800 to 1,000 RPM and continue to run engine for 3 to 5 minutes.
- (6) Release the accelerator pedal.
- (7) Hold the engine stop switch all the way down until the engine shuts down.
- (8) Release the engine stop switch.
- (9) Turn the engine switch to off.
- (10) Turn off the lights.
- (11) Perform after-operation PMCS.

- f. Give safety briefing to include safety restrictions and ground guide precautions for backing the HEMTT.
- g. Demonstrate hand and arm signals required for this exercise.
- h. Demonstrate driving within the training area.

3. Practical exercise:

- a. Assign students to vehicles and issue TM 9-2320-279-10-1, pencil, DA Form 2404, DD Form 1970, and equipment records folder. Tell students where rags, lubricants, and coolant are located.
- b. Students perform before-operation PMCS.
- c. Students practice maneuvering the HEMTT through the courses laid out in the training area(s). Sample training areas are in Chapter 5 (Figures 5-1 through 5-7). During-operation PMCS is also conducted at this time.

NOTE: As each student practices driving, an assistant instructor rides in the right seat. The assistant instructor explains driving techniques, ensures the driver is aware of driving situations, and conducts AARs with each driver. Now is the time to pass on valuable experience and correct any bad driving habits.

- d. Students perform after-operation PMCS. Ensure all operator entries required on DA Form 2404 and DD Form 1970 are accurate, complete, and legible.

4. Evaluate: Check each student's performance of PMCS and driving.

5. Summary:

- a. Recap main points.
- b. Allow for questions.
- c. Clarify questions.
- d. Give closing statement.

6. Retraining: Retrain NO-GOs and slow learners. This can be accomplished using TVT 55-26. Students perform driving tasks daily and are tested on the EOCCT.

E. SAFETY RESTRICTIONS.

- 1. Ensure that all chock blocks are in place when vehicles are parked or maintenance is to be performed.
- 2. Ensure the transmission is in N, the parking brake is set, and the engine is shut off before leaving the vehicle, when the vehicle is parked, or maintenance is being performed.
- 3. Ensure all personnel remove all wristwatches, rings, bracelets, neck chains, and any other jewelry before working in or around the HEMTT.
- 4. Ensure all personnel pay particular attention to the cautions and warnings listed in the operator's manuals.

5. Ensure the driver and ground guides know and understand the hand and arm signals, especially the signal to stop, as outlined in FM 21-305.
6. Ensure ground guide(s) are used when backing.
7. Ensure all backing is conducted at a speed of 5 MPH or less.
8. Do not park the vehicle on a steep grade. Serious injury or death can result or the vent on the M978 tanker may leak.
9. Ensure all personnel wear hearing protection when working in or around a running HEMTT.
10. Ensure all occupants wear seat belts while the vehicle is in operation.
11. Ensure personnel maintain at least three points of contact when mounting or dismounting the vehicle (to include performing PMCS).
12. The vehicle access ladder must be used when performing maintenance. The two hooks on the ladder must be installed in the front skid plate holes, right front fender holes, or left front fender holes as required. When installing or removing the access ladder to or from the right front fender holes, do not hit the fuel-water separator. Hitting the fuel-water separator could cause the glass to break.
13. The vehicle access ladder must be used to mount or dismount the HEMTT cargo body. Install the access ladder in the right front fender holes, climb the ladder, and step into the cargo bed from the right fender.
14. Ensure all personnel are clear of vehicle before engine start is attempted. Operator must visually check to see that all areas of the truck are clear of personnel before attempting to start the engine. Failure to do so could result in serious injury or death to personnel.
15. The radiator is very hot and pressurized during vehicle operation. Let the radiator cool before removing the cap. Failure to comply can result in serious burns.
16. The exhaust pipe and muffler can become very hot during vehicle operation. Be careful not to touch these parts with bare hands or allow the body to come in contact with the exhaust pipe or muffler. Exhaust system parts can become hot enough to cause serious burns.
17. Be careful not to short out battery terminals. Do not smoke or use open flame near batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes.
18. Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep a fire extinguisher within easy reach when working with fuel. Do not work on the fuel system when the engine is hot. Fuel can be ignited by the hot engine. When working with fuel, post signs that read: "NO SMOKING WITHIN 50 FEET OF VEHICLE".
19. Apply brakes gradually when stopping. A panic stop will cause the vehicle wheels to lock, engine to stall, and power steering failure. Failure to do this can result in injury or death.
20. Rapid operation repeatedly of service brakes will consume compressed air supply and cause automatic spring brake application. Failure to follow proper service brake operating procedures may cause serious injury or death to personnel.

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21. Never use the parking brake for normal braking. The wheels will lock up causing a severe skid. A skidding vehicle could result in serious injury or death.

F. **ADDITIONAL COMMENTS AND INFORMATION.** Recommended instructional time is 8 hours (.5 conference, .5 demonstration, and 7.0 practical exercise, including 1.0 PMCS).

LESSON TITLE: DRIVE THE HEMTT ON THE ROAD (PRIMARY AND SECONDARY)

TASK NUMBER: 551-721-1366 (Drive Vehicle with Automatic Transmission)

A. TRAINING OBJECTIVE.

TASK: Drive an M977/M978 HEMTT (empty, partially loaded [5 tons or 1,250 gallons], and fully loaded) on the road (primary and secondary).

CONDITION: Given instruction, DD Form 1970, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, lubricants, coolant, designated driving route (improved surfaced and secondary roads), an M977/M978 HEMTT with BII, vehicle loads, and a requirement to drive a designated route (to include making right and left turns, making gradual steering corrections, signal intentions in advance, pass oncoming vehicles, maintain vehicle interval, obey highway warning and regulatory signs, operate the lights as required, monitor gauges and indicator lights, upshift/downshift the transmission through all gear ranges, manipulate the controls, and perform basic driving maneuvers to include downhill braking [using the engine brake] and backing using ground guides).

STANDARDS: Operate the vehicle correctly and safely without accident or injury.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. Training time: As scheduled.
2. Training location: Motor pool and driver training route (built up and rural areas) as scheduled.
3. Training type: Conference and practical exercise.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for the conference and one assistant instructor for each student for the practical exercise.
6. Training aids and equipment: Rags, lubricants, coolant, DA Form 2404, DD Form 1970, pencil, TM 9-2320-279-10-1, equipment records folder, an M977/M978 HEMTT with BII for each student, and vehicle loads.
7. References: AR 385-55, DA Pamphlet 738-750, FM 21-305, and TM 9-2320-279-10-1.

D. SEQUENCE OF ACTIVITY.

1. Introduction:
 - a. Interest device.
 - b. Tie-in.
 - c. Lesson objective (paragraph A).
 - d. Procedures:

- (1) Explanation.
- (2) Practical exercise.
- (3) Summary.

2. Explanation and demonstration:

NOTE: An instructor will be in the cab whenever a student is driving the HEMTT.

NOTE: The students will be required to drive the vehicle fully loaded, partially loaded, and empty. If three HEMTTs are used, the following arrangement will allow the students to rotate in a round robin fashion:

- One vehicle should be loaded (load should be as close to maximum as possible [11 tons for the M977 and 2,500 gallons for the M978]).
- A second vehicle should be partially loaded (5 to 6 tons for the M977 and 1,250 gallons for the M978).
- The third vehicle should be empty.

NOTE: To prevent loss of cargo or shifting en route:

- On the M977 vehicles, check cargo for blocking and bracing and cargo tiedowns for security before operation and repeatedly during operation.
- On the M978 vehicles, make sure the manhole cover and the pump module doors are closed and latched.

a. Explain putting the vehicle in motion--

- (1) On flat roadways.
- (2) On upgrades.
- (3) On downgrades.
- (4) In sand, snow, and on ice.

b. Explain the procedures for braking--

- (1) Using the engine brake (Jake brake).

NOTE: For detailed information on the use of the engine brake refer to the lesson outline, Operate Engine Brake (Jake Brake).

- (2) Using the service brakes (foot brake).
- (3) Driving on flat roadways.
- (4) Driving on sand, snow, ice, and wet surfaces.
- (5) Using emergency braking procedures.

(6) Downshifting the transmission.

c. Explain procedures for hill climbing--

(1) The engine works hardest when moving a loaded vehicle up a grade. Proper use of gear ranges will shorten the time on hills.

(2) Unless the hill is extreme, begin in gear range D, and depress the accelerator pedal all the way downward. Keep it there as the vehicle moves up the grade. If there is enough power to maintain a satisfactory road speed, remain in this gear range and allow the transmission to upshift and downshift automatically.

(3) As you progress up the hill count the number of downshifts.

NOTE: The automatic transmission is equipped with a lockup clutch which automatically engages after the load is rolling and torque demand is low. This provides increased fuel economy at highway cruising speeds. It automatically releases at lower vehicle speeds. Lockup engagement, like range shifts, may be felt under some conditions and you may hear a slight change in engine sound as RPM drop. A little driving experience will enable you to tell the difference between gear range changes and lockup engagement or disengagement.

(4) When you reach the top of the hill, manually downshift the transmission to the gear that the transmission is in (this was the reason for counting the number of downshifts). This is normally the gear the truck should be in to descend the other side of the hill.

(5) For starting on maximum grades with maximum load (such as vehicle fully loaded), stop the vehicle and shift the transfer to low. Start in gear range 2, depress accelerator pedal to the floor, and manually upshift the lever one range at a time, shifting when engine speed approaches 2,000 RPM.

d. Explain procedures for downhill driving--

(1) Select a "safe" speed that is not too fast for the following:

- Total weight of the vehicle and cargo.
- Length of the grade.
- Steepness of the grade.
- Road conditions.
- Weather.

(2) Manually downshift the transmission into a lower gear before starting downgrade. (The general rule is to use the same gear to descend the grade that would be needed to climb the grade.)

(3) Check brakes before starting the downgrade.

(4) Set the engine brake switch to low. If more braking is needed, set the switch

to high.

NOTE: For detailed information on the use of the engine brake refer to the lesson outline, Operate Engine Brake (Jake Brake).

- (5) Pay attention to signs indicating the location of escape ramps.
- (6) When vehicle speed reaches the maximum “safe” speed, apply the brakes just hard enough to feel a definite slowdown.
- (7) When the vehicle speed has been reduced to approximately 5 MPH below the “safe” speed, release the brakes. (This brake application should last for about 3 seconds.)
- (8) When vehicle speed has increased to the “safe” speed, repeat steps (6) and (7).
- (9) If braking power diminishes, pull off to the side of the road and allow the brakes to cool.

CAUTION

Excessive use of the service brake to control downhill speed will result in the loss of braking power because of heat buildup.

WARNING

Rapid operation repeatedly of service brakes will consume compressed air supply and cause automatic spring brake application. Failure to follow proper service brake operating procedures may cause serious injury or death to personnel.

e. Explain following distances--

- (1) Maintain 1 second for each 10 feet of vehicle length (40 MPH and less). The HEMTT is 34 feet long, so at speeds of up to 40 MPH, allow 4 seconds following distance.
- (2) Increase by 1 second for speeds over 40 MPH. At 45 MPH, with the HEMTT, allow 5 seconds following distance.
- (3) Increase by several seconds for rain, fog, and winter conditions.

f. Explain maneuvering the vehicle--

- (1) In curves.
- (2) Through a constant curve.
- (3) Through a U-turn.
- (4) At intersections.
- (5) At turns.
 - (a) Start to turn before reaching the intersection.

(b) Observe the rear of the truck through the mirrors (for stopped vehicles, signs, light poles, and so on.). Normally, the HEMTT will follow the front wheels with minimal off-tracking.

(6) When steering the vehicle.

NOTE: When driving the HEMTT at highway speeds, new drivers have the tendency to hug the edge of the road and oversteer. To correct this, check the position of the vehicle in the rear view mirrors, keep the vehicle centered in its lane, and make minor steering corrections.

(7) When making gradual steering corrections.

(8) To avoid abrupt steering movements.

(9) When passing stationary and moving vehicles.

g. Explain lane changing--

(1) Signal intentions.

(2) Check mirrors.

h. Explain driving in adverse weather conditions. Two major hazards associated in driving during adverse weather conditions are reduced visibility and reduced traction.

(1) Countermeasures for driving during periods of reduced visibility:

(a) Travel at reduced speeds and be prepared to meet sudden changes in road conditions.

(b) Do not use high beams. Switch to low beams if high beams are on.

(c) Look to the right if blinded by oncoming vehicles.

(d) Do not overrun the headlights and stay twice the normal distance from the vehicle ahead.

(e) Give turn signals sooner.

(f) Apply brakes sooner and press brake pedal lightly to give early warning that vehicle will slow or stop.

(g) Use defrosters and wipers to help keep the windshield clear.

(h) Keep windshield, windows, mirrors, headlights, brake lights, reflectors, and area around air cleaner intake free of snow and ice. Snow and ice may melt, refreeze, and cause restriction in the air intake systems.

(i) Watch for pedestrians and vehicles pulled over to the side of the road.

(j) Use caution when weather reduces visibility to near zero. This is particularly true at night in heavy snow, in a downpour of rain, or dense

fog. When this happens, it is unsafe to drive.

- Exit the highway, stop, and wait until visibility improves before continuing.
- Do not stop on the shoulder with flashers on. Stopping on shoulders may induce a rear end collision/chain reaction.

(2) Reduced traction countermeasures:

- (a) Install tire chains, if needed, for snow or ice.
- (b) Pump the brakes gradually when stopping the vehicle on snow and ice (pumping air brake vehicles may be dangerous, do not pump the brakes more than 3 to 4 times and allow the air pressure to build back up before reapplying the brakes). Sudden braking will cause wheels to lock and vehicle to slide out of control.
- (c) Place the transmission shift lever and the transfer case shift lever in the appropriate driving range to descend or climb steep hills.
- (d) Place the vehicle in motion slowly to prevent wheels from spinning.
- (e) Press the accelerator pedal slowly when changing speed.
- (f) Keep the accelerator pedal steady after vehicle reaches the desired speed.
- (g) Turn the vehicle slowly and make gradual steering adjustments when on slippery surfaces.
- (h) Steer the vehicle away from ruts and large snow banks.
- (i) Steer the vehicle straight up and down hills if possible.
- (j) Check for black ice. Black ice is clear and cannot be seen because the road surface is visible through the ice. The ice becomes invisible to the driver. Black ice usually occurs on bridges, beneath underpasses, in dips in the road, in shaded areas, and on lower sides of banked curves.
 - When driving in rain or near freezing temperatures, feel for ice along the front of a mirror. If ice is there it may be on the road surface as well.
 - When in doubt, test surface traction by first checking to see that nothing is following your vehicle, then slow down and apply the brakes gently to see if the vehicle skids.
- (k) Use the following procedures if the vehicle's rear skids. Sudden changes in speed or direction result from over acceleration, over braking, and over steering. These changes result in skidding and jackknifing.

- Let up on the accelerator pedal.
 - Steer in the same direction in which the rear of the vehicle is skidding.
 - When vehicle is under control, press the brake pedal lightly.
 - Steer vehicle on a straight course and slowly press the accelerator pedal.
- (l) Do the following if the vehicle starts to slide while climbing a hill:
- Let up on the accelerator pedal.
 - Steer the vehicle in the direction of the slide until the vehicle stops sliding.
 - Slowly press the accelerator pedal and steer the vehicle on a straight course.
- (m) The best advice in regard to a stuck vehicle is to avoid getting stuck. However, do the following if the vehicle does get stuck:
- Shovel clear path ahead of each wheel. Put boards, brush, sand, gravel, or similar material in cleared paths to get better traction.
 - If additional power is needed to extract vehicle when mired in snow, place transmission in lowest forward gear range and transfer case (if equipped) in low range. Do not rock the vehicle or spin the wheels.
 - If vehicle remains stuck, use wrecker or another vehicle equipped with winch to tow or winch the stuck vehicle.
 - If vehicle is equipped with a self recovery winch, it may be used to help free the vehicle.
- (n) Drive slowly and test brakes after driving through slush or water. If brakes slip do the following:
- Continue to drive slowly.
 - Apply moderate pressure on brake pedal to cause slight brake drag.
 - When brakes are dry and they no longer slip and uneven braking ceases, let up on the brake pedal.
 - Resume normal driving speed.
- (o) When driving during hot weather, adjust your driving for bleeding tar conditions on the roadway. Do the following to drive under these conditions:

- Frequently scan the roadway ahead.
- Identify a black tar area ahead.
- Maintain steady speed.
- Make no sudden steering maneuvers.
- Make no sudden braking maneuvers.
- If braking is required, ensure all wheels are on a similar surface.

i. Give safety briefing.

j. Explain ground guide safety precautions for backing the truck.

3. Practical exercise:

a. Assign students to vehicles and issue TM 9-2320-279-10-1, pencils, DA Form 2404, DD Form 1970, and equipment records folder. Instruct students on the location of rags, lubricants, and coolant.

b. Students perform before-operation PMCS.

c. Students practice driving the vehicle on the road (primary and secondary). During-operation PMCS is also conducted at this time.

NOTE: As each student practices driving, an assistant instructor rides in the right seat. The assistant instructor explains driving techniques, ensures the driver is aware of driving situations, and conducts AARs with each driver. Now is the time to pass on valuable experience and correct any bad driving habits.

d. Students perform after-operation PMCS. Ensure all operator entries required on DA Form 2404 and DD Form 1970 are accurate, complete, and legible.

4. Evaluate: Check each student's performance of PMCS and driving.

5. Summary:

a. Recap main points.

b. Allow for questions.

c. Clarify questions.

d. Give closing statement.

6. Retraining: Retrain NO-GOs and slow learners. Students perform driving tasks daily and are tested on the EOCCT.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when vehicles are parked or maintenance is to be performed.

2. Ensure the transmission is in N, the parking brake is set, and the engine is shut off before leaving the vehicle, when the vehicle is parked, or maintenance is being performed.
3. Ensure all personnel remove all wristwatches, rings, bracelets, neck chains, and any other jewelry before working in or around the HEMTT.
4. Ensure all personnel pay particular attention to the cautions and warnings listed in the operator's manuals.
5. Ensure the driver and ground guides know and understand the hand and arm signals, especially the signal to stop, as outlined in FM 21-305.
6. Ensure ground guide(s) are used when backing.
7. Ensure all backing is conducted at a speed of 5 MPH or less.
8. Do not park the vehicle on a steep grade. Serious injury or death can result or the vent on the M978 tanker may leak.
9. Ensure all personnel wear hearing protection when working in or around a running HEMTT.
10. Ensure all occupants wear seat belts while the vehicle is in operation.
11. Ensure personnel maintain at least three points of contact when mounting or dismounting the vehicle (to include performing PMCS).
12. The vehicle access ladder must be used when performing maintenance. The two hooks on the ladder must be installed in the front skid plate holes, right front fender holes, or left front fender holes as required. When installing or removing the access ladder to or from the right front fender holes, do not hit the fuel-water separator. Hitting the fuel-water separator could cause the glass to break.
13. The vehicle access ladder must be used to mount or dismount the HEMTT cargo body. Install the access ladder in the right front fender holes, climb the ladder, and step into the cargo bed from the right fender.
14. Ensure all personnel are clear of vehicle before engine start is attempted. Operator must visually check to see that all areas of the truck are clear of personnel before attempting to start the engine. Failure to do so could result in serious injury or death to personnel.
15. The radiator is very hot and pressurized during vehicle operation. Let the radiator cool before removing the cap. Failure to comply can result in serious burns.
16. The exhaust pipe and muffler can become very hot during vehicle operation. Be careful not to touch these parts with bare hands or allow the body to come in contact with the exhaust pipe or muffler. Exhaust system parts can become hot enough to cause serious burns.
17. Be careful not to short out battery terminals. Do not smoke or use open flame near batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes.
18. Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep a fire extinguisher within easy reach when working with fuel. Do not work on the fuel system when the engine is hot. Fuel can be ignited by the hot engine. When working with fuel, post signs that read: "NO SMOKING WITHIN 50 FEET OF VEHICLE."

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19. Apply brakes gradually when stopping. A panic stop will cause the vehicle wheels to lock, engine to stall, and power steering failure. Failure to do this can result in injury or death.

20. Rapid operation repeatedly of service brakes will consume compressed air supply and cause automatic spring brake application. Failure to follow proper service brake operating procedures may cause serious injury or death to personnel.

21. Never use the parking brake for normal braking. The wheels will lock up causing a severe skid. A skidding vehicle could result in serious injury or death.

22. Excessive use of the service brake to control downhill speed will result in the loss of braking power because of heat buildup.

23. Apply the engine brake only when vehicle tires have good traction. Use of the engine brake on slippery surfaces can cause the vehicle to skid and cause injury to personnel.

F. **ADDITIONAL COMMENTS AND INFORMATION.** Recommended instructional time is 16 hours (1.0 conference and 15.0 practical exercise, including 2.0 PMCS).

LESSON TITLE: DRIVE AN M977/M978 HEMTT OFF ROAD

TASK NUMBER: 551-721-1360 (Drive Cargo Vehicle on Side Roads and Unimproved Roads)

A. TRAINING OBJECTIVE.

TASK: Drive a loaded M977/M978 HEMTT and a partially loaded M978 HEMTT off road.

CONDITION: Given instruction, DD Form 1970, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, lubricants, coolant, a suitable training area, an M977/M978 HEMTT with BII, and a requirement to operate the vehicle off road (to include streams, ravines, gullies, ditches, wooded areas, rocky terrain, swamps, and mud).

STANDARDS: Operate the vehicle safely at reduced speeds and over rough terrain without damaging the vehicle.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. Training time: As scheduled.
2. Training location: Classroom, motor pool, and off road driver training area as scheduled.
3. Training type: Conference and practical exercise.
4. Students: Scheduled personnel.

5. Principal and assistant instructors required: One primary instructor for the conference and one assistant instructor for each student for the practical exercise.

6. Training aids and equipment: Television, VCR, TVT 55-26, rags, lubricants, coolant, DA Form 2404, DD Form 1970, pencil, TM 9-2320-279-10-1, equipment records folder, and an M977/M978 HEMTT with BII for each student.

7. References: AR 385-55, DA Pamphlet 738-750, FM 21-305, and TM 9-2320-279-10-1.

D. SEQUENCE OF ACTIVITY.

1. Introduction:
 - a. Interest device.
 - b. Tie-in.
 - c. Lesson objective (paragraph A).
 - d. Procedures:
 - (1) Explanation.
 - (2) Practical exercise.

(3) Summary.

2. Explanation and demonstration:

NOTE: An instructor will be in the cab whenever a student is driving the HEMTT.

a. As an option, show TVT 55-26, to reinforce driving tasks. This step may be deleted because the students should have viewed this TVT in earlier lessons.

b. In driving the HEMTT vehicle off road, there are two devices on the vehicle to give extra traction. These devices are the following:

(1) Transfer case shift lever. In LO range position, it gives the vehicle 8-wheel drive. Do not move the lever when the vehicle is moving or the transmission is in gear.

(2) Traction control lever. Set to 8X8 drive to give the vehicle all wheel drive (when the transfer lever is in HI). For maximum traction, it is set to INTER-AXLE DIFF. LOCK and the transfer case is in LO. This locks the intermediate axles together to pull at the same time. This can also be set to INTER-AXLE DIFF. LOCK when transfer case is in HI. Do not shift the traction control lever while the vehicle is moving. After the traction control lever is shifted, let the vehicle creep forward several feet to allow the shift collars to fully engage.

c. Shallow ditches require the following maneuvers:

(1) Stop the vehicle.

(2) Check the terrain for obstacles.

(3) Shift the transfer case shift lever and the traction control lever as needed to gain traction.

(4) Move the transmission range selector to 1.

(5) Slowly approach the ditch at an angle.

(6) Steer the vehicle toward the ditch so that one wheel on an axle will leave the ditch as the other wheel on the same axle enters it.

d. Deep ditches require the following driving techniques:

(1) Stop the vehicle.

(2) Check the terrain for obstructions.

(3) Cut away both sides of the ditch if necessary.

(4) Shift the transfer case shift lever and the traction control lever as needed to gain traction.

(5) Move the transmission shift lever to 1.

(6) Slowly approach the ditch at an angle.

(7) Accelerate the vehicle enough to keep it rolling as it goes up the other side.

e. Gullies and ravines require the following maneuvers:

- (1) Stop the vehicle.
- (2) Check the terrain for obstructions.
- (3) Shift the transfer case shift lever and the traction control lever as needed to gain traction.
- (4) Move the transmission shift lever to 1.
- (5) Ease the front wheels over the edge and into the ravine or gully.
- (6) Steer a straight course so both front wheels strike the bottom at the same time.
- (7) Accelerate enough so that the vehicle can climb up the opposite bank.

f. Wooded area driving techniques include the following:

- (1) Stop the vehicle.
- (2) Check the terrain for obstructions.
- (3) Remove tarps and bows as necessary.
- (4) Shift the transfer case shift lever and the traction control lever as needed to gain traction.
- (5) Move the transmission shift lever to 2 or 1 depending on the condition of the ground.
- (6) Maneuver around obstructions.

g. Rocky terrain requires the following driving techniques:

- (1) Stop the vehicle.
- (2) Check the terrain for obstructions.
- (3) Shift the transfer case shift lever and the traction control lever as needed to control vehicle speed and to gain traction.
- (4) Move the transmission shift lever to 2 or 1 as needed.
- (5) Drive slowly, maneuver around large boulders, and choose route while underway.

h. Forging streams calls for these handling techniques:

- (1) Ensure the depth of the fording site is not more than 4 feet and the water flow of the stream is not too swift.

WARNING

Do not ford water unless depth is known. Water deeper than 4 feet may enter the vehicle causing personnel injury or death.

- (2) Ensure the bottom at the fording site is firm enough that 4 feet maximum fording depth will not be exceeded and the vehicle will not become mired.
- (3) Secure loose objects in the cab of the truck and check load security (past accidents have involved soldiers drowning because they were trapped by materials such as camouflage nets).
- (4) Stop the vehicle at the edge of the water.
- (5) If the brakes have been used heavily and are hot, allow drums and shoes to cool before entering the water if possible.
- (6) Ensure the engine is operating correctly before entering the water.
- (7) Set the transfer case shift lever to LO and the traction control lever to INTER-AXLE DIFF. LOCK.
- (8) Move the transmission shift lever to 1.
- (9) Drive the vehicle slowly into the water.
- (10) If the engine stops, immediately attempt to restart the engine. If the vehicle will not start, tow or winch the vehicle from the water with another vehicle as soon as possible.
- (11) Drive the truck at 3 to 4 MPH or less through water.
- (12) Unless absolutely necessary, do not stop while in the water.
- (13) Do the following if the vehicle accidentally enters water deeper than 4 feet (remember the height of the metal horizontal bar across the center of the floor window is 4 feet):
 - (a) Press on the brake pedal and hold to stop the vehicle.
 - (b) Move the transmission shift lever to R.
 - (c) Let up on the brake pedal.
 - (d) Slowly back the vehicle out of deep water.
- (14) After leaving the water, press the brake pedal lightly and hold while driving slowly to dry out brake linings.
- (15) When clear of the fording area, stop the vehicle, apply and release the parking brake several times to remove water from the brake components.
- (16) Remove water and clean deposits from all vehicle parts as soon as possible.

(17) Lubricate, perform PMCS, and deliver vehicle to organizational maintenance as soon as possible.

i. Operating in sand requires the following techniques:

- (1) Check air filter restriction indicator often.
- (2) Adjust tire pressure.
- (3) Set the transfer case shift lever to LO (this also engages 8X8 drive).
- (4) Set the traction control lever to INTER-AXLE DIFF. LOCK for added traction.
- (5) Set the transmission range selector to 2 or 1 as needed for added traction.
- (6) Start slowly; do not spin the wheels when starting to move the vehicle.
- (7) Do not straddle sand mounds or drive on the sides of two sand mounds. Loose sand will not support the vehicle on steep slopes.
- (8) Keep the accelerator steady after the vehicle reaches the desired speed.
- (9) Turn the vehicle slowly when on loose sand.
- (10) Steer the vehicle straight up and down hills if possible.
- (11) Do the following to move the vehicle forward and turn after the vehicle is stopped in loose sand:
 - (a) Set the transmission range selector to R.
 - (b) Press the accelerator pedal and move the vehicle straight back about 20 feet.
 - (c) Release the accelerator pedal and press the brake pedal.
 - (d) Set the transmission range selector to 1.
 - (e) Release the brake pedal and press the accelerator pedal to move the vehicle forward.
 - (f) Turn the vehicle gradually.
 - (g) Move the transmission range selector to D when the vehicle picks up speed and is moving forward smoothly.

j. Mud and swamps require the following driving techniques:

- (1) Stop the vehicle and check the terrain for obstructions.
- (2) Set the transfer case shift lever to LO and move the traction control lever to INTER-AXLE DIFF. LOCK.

(3) Move the transmission shift lever to 2 or 1 as needed.

(4) Drive through the area maintaining a steady speed.

k. Clean mud from wheels, brakes axles, universal joints, steering mechanism, and radiator as soon as possible. Make sure the axle breather vent caps move freely on breather body.

l. Give safety briefing, to include reinforcing ground guide safety procedures for backing the vehicle.

3. Practical exercise:

a. Assign students to vehicles and issue TM 9-2320-279-10-1, pencils, DA Form 2404, DD Form 1970, and equipment records folder. Instruct students on the location of rags, lubricants, and coolant.

b. Students perform before-operation PMCS.

c. Students practice driving the HEMTT off road. During-operation PMCS is conducted at this time.

NOTE: As each student practices driving, an assistant instructor rides in the right seat. The assistant instructor explains driving techniques, ensures the driver is aware of driving situations, and conducts AARs with each driver. Now is the time to pass on valuable experience and correct any bad driving habits.

d. Students perform after-operation PMCS and ensure all operator entries required on DA Form 2404 and DD Form 1970 are accurate, complete, and legible.

4. Evaluation: Check each student's performance of PMCS and off road driving.

5. Summary:

a. Recap main points.

b. Allow for questions.

c. Clarify questions.

d. Closing statement.

6. Retrain NO-GOs and slow learners. This can be accomplished using TVT 55-26 and reinforced with additional off road driving. Students are tested on the EOCCT.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when vehicles are parked or maintenance is to be performed.

2. Ensure the transmission is in N, the parking brake is set, and the engine is shut off before leaving the vehicle, when the vehicle is parked, or maintenance is being performed.

3. Ensure all personnel remove all wristwatches, rings, bracelets, neck chains, and any other jewelry before working in or around the HEMTT.

4. Ensure all personnel pay particular attention to the cautions and warnings listed in the operator's manuals.
5. Ensure the driver and ground guides know and understand the hand and arm signals, especially the signal to stop, as outlined in FM 21-305.
6. Ensure ground guide(s) are used when backing.
7. Ensure all backing is conducted at a speed of 5 MPH or less.
8. Do not park the vehicle on a steep grade. Serious injury or death can result or the vent on the M978 tanker may leak.
9. Ensure all personnel wear hearing protection when working in or around a running HEMTT.
10. Ensure all occupants wear seat belts while the vehicle is in operation.
11. Ensure personnel maintain at least three points of contact when mounting or dismounting the vehicle (to include performing PMCS).
12. The vehicle access ladder must be used when performing maintenance. The two hooks on the ladder must be installed in the front skid plate holes, right front fender holes, or left front fender holes as required. When installing or removing the access ladder to or from the right front fender holes, do not hit the fuel-water separator. Hitting the fuel-water separator could cause the glass to break.
13. The vehicle access ladder must be used to mount or dismount the HEMTT cargo body. Install the access ladder in the right front fender holes, climb the ladder, and step into the cargo bed from the right fender.
14. Ensure all personnel are clear of vehicle before engine start is attempted. Operator must visually check to see that all areas of the truck are clear of personnel before attempting to start the engine. Failure to do so could result in serious injury or death to personnel.
15. The radiator is very hot and pressurized during vehicle operation. Let the radiator cool before removing the cap. Failure to comply can result in serious burns.
16. The exhaust pipe and muffler can become very hot during vehicle operation. Be careful not to touch these parts with bare hands or allow the body to come in contact with the exhaust pipe or muffler. Exhaust system parts can become hot enough to cause serious burns.
17. Be careful not to short out battery terminals. Do not smoke or use open flame near batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes.
18. Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep a fire extinguisher within easy reach when working with fuel. Do not work on the fuel system when the engine is hot. Fuel can be ignited by the hot engine. When working with fuel, post signs that read: "NO SMOKING WITHIN 50 FEET OF VEHICLE."
19. Apply brakes gradually when stopping. A panic stop will cause the vehicle wheels to lock, engine to stall, and power steering failure. Failure to do this could result in injury or death.
20. Rapid operation repeatedly of service brakes will consume compressed air supply and cause automatic spring brake application. Failure to follow proper service brake operating procedures may cause serious injury or death to personnel.

TC 21-305-1

21. Never use the parking brake for normal braking. The wheels will lock up causing a severe skid. A skidding vehicle could result in serious injury or death.

22. Excessive use of the service brake to control downhill speed will result in the loss of braking power because of heat buildup.

23. Apply the engine brake only when vehicle tires have good traction. Use of the engine brake on slippery surfaces can cause the vehicle to skid and cause injury to personnel.

24. Ensure students maintain a safe following distance and speed limit when driving on the off road driving course (as determined by the local command).

F. **ADDITIONAL COMMENTS AND INFORMATION.** Recommended instructional time is 6 hours (.5 conference and 5.5 hours practical exercise, including 1.0 PMCS).

LESSON TITLE: DRIVE THE HEMTT AT NIGHT

TASK NUMBER: 551-721-1366 (Drive Vehicle with Automatic Transmission)

A. TRAINING OBJECTIVE.

TASK: Drive an M977/M978 HEMTT at night.

CONDITION: Given instruction, DD Form 1970, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, lubricants, coolant, designated driving route (improved surfaced and secondary roads), an M977/M978 HEMTT with BII, and a requirement to drive the designated route at night with headlights; use defensive driving (accident avoidance) methods, operate the light switch, read gauges, upshift and downshift the transmission, manipulate the controls, use correct braking procedures, and perform basic driving maneuvers.

STANDARDS: Operate the vehicle correctly and safely without accident or injury according to TM 9-2320-279-10-1.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. Training time: As scheduled.
2. Training location: Motor pool and driver training route (built-up and rural areas) as scheduled.
3. Training type: Conference and practical exercise.
4. Students: Scheduled personnel.
5. Principal and assistant instructors required: One primary instructor for the conference and one assistant instructor for each student for the practical exercise.
6. Training aids and equipment: Rags, lubricants, coolant, DA Form 2404, DD Form 1970, pencil, TM 9-2320-279-10-1, equipment records folder, and an M977/M978 HEMTT with BII for each student.
7. References: AR 385-55, DA Pamphlet 738-750, FM 21-305, and TM 9-2320-279-10-1.

D. SEQUENCE OF ACTIVITY.

1. Introduction:
 - a. Interest device.
 - b. Tie-in.
 - c. Lesson objective (paragraph A).
 - d. Procedures.
 - (1) Explanation.

(2) Practical exercise.

(3) Summary.

2. Explanation and demonstration:

NOTE: An instructor will be in the cab whenever a student is driving the HEMTT.

NOTE: Students are licensed on other military vehicles and should only require refresher training on night driving factors and procedures.

a. Night driving factors.

(1) Driver factors:

(a) Vision. The driver has limited vision at night because of the following:

- Eyes need time to adjust to the change between light and darkness.
- Drivers cannot see as sharply at night.
- Drivers cannot see to the sides as well at night.

(b) Glare. Temporary blindness is caused by glare, normally from oncoming headlights but sometimes from other lights.

(c) Fatigue. Reduces the ability to see clearly. The driver becomes less alert, slower to see hazards, and does not react as promptly.

(d) Driver inexperience. Newness to driving, coupled with the problems of reduced vision, glare, and fatigue account for the fact new drivers have higher nighttime accident rates than more experienced drivers.

(2) Roadway factors:

(a) Low illumination. Illumination provided by street lights is often only fair to poor. On most roads, the only illumination is from the driver's headlights. Headlights are useful for a relatively short and narrow path directly ahead of the vehicle. Headlights do not bend around corners.

(b) Variation in illumination. The driver must constantly adjust his eyes to different types and degrees of lighting. Flashing lights distract as much as they illuminate. Traffic signs are hard to see against the background of other lights especially in towns and cities.

(c) Familiarity with roads. The driver needs to be particularly alert on roads that he has never driven during the day. On familiar roads, drivers tend to be overconfident. This is dangerous because of the following:

- The view of the roadway is not the same.
 - Situations on some stretches will change.
- (d) Other road users. The driver must adjust his driving to hazards such as pedestrians, joggers, bicyclists, and animals.
- (e) Drinking drivers. The likelihood of encountering drunken drivers increases after sundown. Be especially alert when driving near roadside taverns and similar attractions.

(3) Vehicle factors:

- (a) Headlights. Sight distance is limited to the range of the headlights. Therefore, the driver must drive at a speed that allows him to stop within his sight distance.
- (b) Auxiliary lights. Trucks are better seen at night by other drivers when reflectors, marker lights, clearance lights, tail lights, and brake lights are clean and working properly.
- (c) Turn signals. The ability to communicate with other drivers depends on turn signals. Nonfunctional or dirty turn signal lights greatly increase the risk of an accident.
- (d) Windshield and wipers. A clean windshield and properly working wipers are a must for safe driving.
- (e) Mirrors. Mirrors help the driver see what is going on around him. Keep them clean and properly adjusted.

b. Night driving procedures.

(1) Preparing to drive at night:

- (a) Getting yourself ready.
- If you wear glasses, be sure they are clean.
 - Remove sunglasses.
 - Be well rested.
- (b) Plan your route.
- Know the location of rest stops.
 - Plan for hazards such as unlighted areas, exit ramps, construction areas, and other changes in the highway environment.
- (c) Getting the vehicle ready.
- Ensure windshield, mirrors, lights, and reflectors are clean.

- Ensure all lights are operational.

(2) Driving at night:

(a) Avoid blinding others.

- Dim high beams when oncoming vehicles are less than 500 feet away.
- Do not use high beams to retaliate against other drivers.

(b) Avoid glare.

- Set interior panel lights at the lowest setting to reduce glare.
- Look to the right when oncoming vehicles are using high beams.

(c) Maximize visibility.

- Use low beams when desired visual range is about 250 feet.
- Use high beams when there are no oncoming vehicles and desired visual range is 350 to 500 feet.

(d) Adjust basic driving techniques.

- Exercise additional caution because of reduced vision.
- Signal earlier than you would during daylight to give other drivers more time to react.

3. Practical exercise:

a. Assign students to vehicles and issue TM 9-2320-279-10-1, pencils, DA Form 2404, DD Form 1970, and equipment records folder. Instruct students on the location of rags, lubricants, and coolant.

b. Students perform before-operation PMCS to include the operation and cleanliness of all lights.

c. Give safety briefing with emphasis on safety precautions for night operations.

d. Students drive the designated route. During-operation PMCS is also conducted at this time.

NOTE: As each student practices driving, an assistant instructor rides in the right seat. The assistant instructor explains driving techniques, ensures the driver is aware of driving situations, and conducts AARs with each driver. Now is the time to pass on valuable experience and correct any bad driving habits.

e. Students perform after-operation PMCS and ensure all operator entries required on DA Form 2404 and DD Form 1970 are accurate, complete, and legible.

4. Evaluation: Check each student's performance of PMCS and night driving.
5. Summary:
 - a. Recap main points.
 - b. Allow for questions.
 - c. Clarify questions.
 - d. Give closing statement.
6. Retraining: Retrain NO-GOs and slow learners.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when vehicles are parked or maintenance is to be performed.
2. Ensure the transmission is in N, the parking brake is set, and the engine is shut off before leaving the vehicle, when the vehicle is parked, or maintenance is being performed.
3. Ensure all personnel remove all wristwatches, rings, bracelets, neck chains, and any other jewelry before working in or around the HEMTT.
4. Ensure all personnel pay particular attention to the cautions and warnings listed in the operator's manuals.
5. Ensure the driver and ground guides know and understand the hand and arm signals, especially the signal to stop, as outlined in FM 21-305.
6. Ensure ground guide(s) are used when backing.
7. Ensure all backing is conducted at a speed of 5 MPH or less.
8. Do not park the vehicle on a steep grade. Serious injury or death can result or the vent on the M978 tanker may leak.
9. Ensure all personnel wear hearing protection when working in or around a running HEMTT.
10. Ensure all occupants wear seat belts while the vehicle is in operation.
11. Ensure personnel maintain at least three points of contact when mounting or dismounting the vehicle (to include performing PMCS).
12. The vehicle access ladder must be used when performing maintenance. The two hooks on the ladder must be installed in the front skid plate holes, right front fender holes, or left front fender holes as required. When installing or removing the access ladder to or from the right front fender holes, do not hit the fuel-water separator. Hitting the fuel-water separator could cause the glass to break.
13. The vehicle access ladder must be used to mount or dismount the HEMTT cargo body. Install the access ladder in the right front fender holes, climb the ladder, and step into the cargo bed from the right fender.

14. Ensure all personnel are clear of vehicle before engine start is attempted. Operator must visually check to see that all areas of the truck are clear of personnel before attempting to start the engine. Failure to do so could result in serious injury or death to personnel.

15. The radiator is very hot and pressurized during vehicle operation. Let the radiator cool before removing the cap. Failure to comply can result in serious burns.

16. The exhaust pipe and muffler can become very hot during vehicle operation. Be careful not to touch these parts with bare hands or allow the body to come in contact with the exhaust pipe or muffler. Exhaust system parts can become hot enough to cause serious burns.

17. Be careful not to short out battery terminals. Do not smoke or use open flame near batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes.

18. Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep a fire extinguisher within easy reach when working with fuel. Do not work on the fuel system when the engine is hot. Fuel can be ignited by the hot engine. When working with fuel, post signs that read: "NO SMOKING WITHIN 50 FEET OF VEHICLE."

19. Apply brakes gradually when stopping. A panic stop will cause the vehicle wheels to lock, engine to stall, and power steering failure. Failure to do this could result in injury or death.

20. Rapid operation repeatedly of service brakes will consume compressed air supply and cause automatic spring brake application. Failure to follow proper service brake operating procedures may cause serious injury or death to personnel.

21. Never use the parking brake for normal braking. The wheels will lock up causing a severe skid. A skidding vehicle could result in serious injury or death.

22. Excessive use of the service brake to control downhill speed will result in the loss of braking power because of heat buildup.

23. Apply the engine brake only when vehicle tires have good traction. Use of the engine brake on slippery surfaces can cause the vehicle to skid and cause injury to personnel.

24. Ensure a safe following distance and speed are maintained when driving on the designated route (as determined by the local command).

F. **ADDITIONAL COMMENTS AND INFORMATION.** Recommended instructional time is 5 hours (.5 conference and 4.5 practical exercise, including 1.0 PMCS).

LESSON TITLE: CHANGE TIRE ON HEMTT USING TIRE DAVIT

TASK NUMBER: 551-721-1352 (Perform Vehicle Preventive Maintenance Checks and Services [PMCS])

A. TRAINING OBJECTIVE.

TASK: Change a tire on the HEMTT using the tire davit.

CONDITION: Given instruction, TM 9-2320-279-10-1, rags, heavy work gloves, hearing protection, an M977/M978 with BII, and a requirement to change a simulated flat tire on the truck.

STANDARDS: Perform task in the correct sequence according to TM 9-2320-279-10-1 and without damage to equipment or injury to personnel. Students will be graded on a GO/NO-GO basis.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. Training time: As scheduled.
2. Training location: Training area or motor pool as scheduled.
3. Training type: Demonstration and practical exercise.
4. Students: Scheduled personnel.

5. Principal and assistant instructors required: One primary instructor for the class, one assistant instructor for every six students for the demonstration, and one assistant instructor for every two students for the practical exercise.

6. Training aids and equipment: Rags, heavy work gloves, TM 9-2320-279-10-1, and an M977/M978 HEMTT with BII for every two students. Hearing protection is required for all personnel.

7. References: TM 9-2320-279-10-1.

D. SEQUENCE OF ACTIVITY.

1. Introduction:
 - a. Interest device.
 - b. Tie-in.
 - c. Lesson objective (paragraph A).
 - d. Procedures.
 - (1) Explanation.
 - (2) Practical exercise.

(3) Summary.

2. Explanation and demonstration:

NOTE: Changing a tire on the HEMTT is a two-soldier task. One soldier cannot safely do this task.

a. Review safety warnings.

b. Park the vehicle.

(1) Park the vehicle in a safe area, out of traffic, where there is no traffic danger to personnel changing the tire. Also, the vehicle must be parked on hard, level ground.

(2) Set the parking brake, shift the transmission range selector to N, and shut off the engine.

(3) Turn on emergency flashers as dictated by traffic hazards.

(4) Position emergency reflective triangles as dictated by traffic hazards.

(5) Chock the wheels. It is best to chock a front wheel on the opposite side of the vehicle. For example, if the right front tire of axle one were flat, chock the left front tire of axle two, front and rear of the tire, to prevent movement in either direction.

c. Tools. Remove all necessary tools from vehicle and vehicle stowage boxes (jack, jack handle extension, jack plate, adjustable wrench, wrench handle, and wheel lugnut wrench).

d. Set up tire davit.

(1) Remove the hoist arm from the mounting bracket.

(2) Install the hoist arm in the tire davit mount.

(3) Remove and keep the safety pin and securing pin from the hoist arm.

(4) Remove the nut, washer, and extension from the tire davit mount.

(5) Install the extension on the hoist arm. Line up the holes in the extension and hoist arm and install the securing pin and safety pin.

WARNING

Ensure all personnel wear protective gloves at all times when handling the spare tire winch cable. The cable may fray and injury to personnel may result.

(6) Turn the handcrank on the hoist arm counterclockwise and route the cable over the end of the pulley.

e. Position jack and remove the spare tire.

(1) Position the jack base plate, jack, and handle under the vehicle equalizer

beam nearest the flat tire.

- (2) If the vehicle is sitting too low for the jack to fit under the equalizer beam, the vehicle must be driven onto a chock block so that the chock block is under the flat tire. This will raise the vehicle and allow enough space for the jack to fit under the equalizer beam.
- (3) Unscrew the jack ram until it touches the equalizer beam approximately 4 to 5 inches from the beam center pivot point.
- (4) Position the vehicle ladder on the right side of the vehicle, climb the ladder, and get in position by the tire davit.

WARNING

Ensure all personnel wear protective gloves at all times when handling the spare tire winch cable. The cable may fray and injury to personnel may result.

- (5) Turn handcrank counterclockwise to let out enough cable to push through the wheel and wrap around the spare tire.

CAUTION

Never run the cable through the slot that has the valve stem. The cable might damage the valve stem causing the spare tire to lose air.

- (6) If the slot in the rim is positioned at the top of the spare tire (12 o'clock position), route the cable through the slot, around the spare tire, and secure with the hook. Do not use this slot if the valve stem is positioned here. If the slot is not positioned at the top or the valve stem is positioned here, route the cable through the axle hole, around the spare tire, and secure with the hook.
- (7) Turn the handcrank clockwise to put light tension on the cable.
- (8) Release the clamp and disconnect the tiedown strap from the bracket on both sides of the spare tire.
- (9) Hook the tiedown strap through the lugnut holes on both sides of the spare tire. The strap will be used later to guide the spare tire.
- (10) Turn the handcrank counterclockwise and remove the spare tire lever and holddown plate. Keep the lever and holddown plate to use later when mounting the flat tire.

WARNING

Stand clear of the tire when raising or lowering. Do not let the tire hang in midair for a long period of time. Place the tire on the carrier or on the ground as soon as possible. The tire is very heavy and could cause serious injury or death if it falls.

NOTE: One soldier stands on the right fender to operate the tire davit winch while the other soldier stands on the ground near the second axle to guide the tire assembly down.

- (11) Remove the vehicle access ladder from the right fender and set it out of the way.

- (12) Turn the handcrank clockwise to lift the spare tire just above the carrier.
- (13) The driver swings the hoist arm so the spare tire is clear of the vehicle while the assistant driver pulls on the tiedown strap to guide the spare tire out of the carrier.
- (14) The driver turns the handcrank counterclockwise to lower the spare tire to the ground.
- (15) Remove the tiedown strap.
- (16) Push the spare tire against the vehicle.
- (17) Remove the cable from the spare tire and roll the spare tire next to the axle of the flat tire.
- (18) Check the spare tire air pressure and adjust air pressure as required.

f. Remove flat tire or wheel.

- (1) Using the wheel lugnut wrench and handle, loosen the 10 lugnuts until they turn easily.

NOTE: Studs and lugnuts on the left side of the vehicle have left-hand threads. Rotate lugnuts clockwise to loosen, counterclockwise to tighten. Studs and lugnuts on the right side of the vehicle have right-hand threads. Rotate lugnuts counterclockwise to loosen, clockwise to tighten.

- (2) Raise the jack until the flat tire is slightly off the ground.

NOTE: If wheel chock was used to help position the jack (under flat tire), the tire does not have to be clear of the chock.

WARNING

One soldier should steady the tire during removal. A falling tire may cause injury or death.

- (3) Remove the 10 lugnuts from the studs. Set the lugnuts aside.

NOTE: If wheel chock was not used to position jack, skip step (4).

- (4) Remove wheel chock and put in stowage.
- (5) Using jack, lower the vehicle until the flat tire is just touching the ground.
- (6) One soldier tilts the top of the flat tire forward, while the other soldier raises the jack slightly. The tire should move forward.
- (7) Repeat steps (5) and (6) to walk the flat tire off the studs. The wheel lugnut wrench handle may be used under the tire to assist sliding or creeping wheel away from the hub.
- (8) Remove the flat tire and lean the flat tire against the vehicle out of the way.

- g. Install spare tire and wheel.

NOTE: Tire tread is nondirectional. Vehicle operation is not affected by the direction of traction bars.

- (1) Roll the spare tire up to the axle where the flat tire was removed.

NOTE: Check that the spare tire wheel dish is in the same position as the flat tire wheel dish. Deep side of the wheel dish will face toward the vehicle on the four front wheels. Deep side of the wheel dish will face away from the vehicle on the four rear wheels except the M984E1. All eight wheels on the M984E1 are installed with the deep side of the wheel dish facing toward the vehicle.

- (2) Make sure the deep side of the spare tire wheel dish is in the same position as the flat tire wheel dish when the flat tire was removed.

NOTE: The tire valve stem can be rotated in wheel so it points out away from the vehicle. The valve cap must be removed to rotate the valve stem.

- (3) Make sure the tire valve stem is pointing out away from the vehicle.
 (4) Line up the holes in the spare tire with the studs.

WARNING

The tire assembly is very heavy. Do not try to lift or catch the tire assembly. Injury to personnel could result.

- (5) Lean the top of the spare tire against the studs and axle.

WARNING

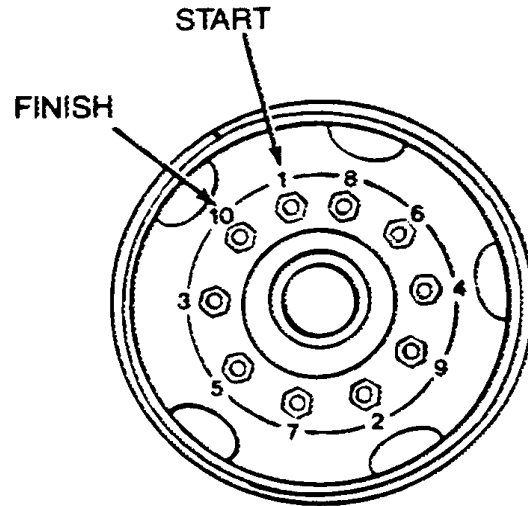
The jack is under heavy pressure. Keep hand, arm, and head clear while slowly raising or lowering the jack to avoid injury to personnel. Do not lower the jack too quickly as the tire could fall causing serious injury or death.

- (6) Slide the spare tire onto the hub and studs. The jack may have to be raised slightly to accommodate the spare tire. The wheel lugnut wrench handle may be placed near the bottom of the tire to either side and raised up to move the tire forward on the hub and studs.
 (7) Continue with step (6) until the spare tire is seated on the axle and studs.

NOTE: Studs and lugnuts on the left side of the vehicle have left-hand threads. Rotate lugnuts clockwise to loosen, counterclockwise to tighten. Studs and lugnuts on the right side of the vehicle have right-hand threads. Rotate lugnuts counterclockwise to loosen, clockwise to tighten.

- (8) Install and tighten the 10 lugnuts using the wheel lugnut wrench to tighten in the sequence as shown.
 (9) Use the jack to carefully lower the vehicle to the ground.
 (10) Remove the jack and the jack base plate from under the equalizer beam.

- (11) Tighten the 10 lugnuts in order as shown until they no longer tighten.



- h. Stow tire using the tire davit.

- (1) Roll flat tire under hoist arm so deep side of wheel dish is facing out and away from the vehicle.

NOTE: One soldier stands on the right fender to operate the tire davit winch while the other soldier stands on the ground near the second axle to guide the tire assembly into the carrier.

- (2) Turn the handcrank on the hoist arm counterclockwise to let out cable.
- (3) Pull tiedown strap through the wheel and hook the ends to hole on both sides of the wheel.

CAUTION

Never run the cable through the slot that has the valve stem. The cable might damage the valve stem causing the spare tire to lose air.

WARNING

Ensure all personnel wear protective gloves at all times when handling the spare tire winch cable. The cable may fray and injury to personnel may result.

- (4) Route the cable through the slot in the rim that is positioned at the top of the spare tire (12 o'clock position). Continue to route the cable through the slot and around the flat tire.
- (5) Attach the hook to the cable above the flat tire.

WARNING

Stand clear of the tire when raising or lowering. Do not let the tire hang in midair for a long period of time. Place the tire on the carrier or on the ground as soon as possible. The tire is very heavy and could cause serious injury or death if it falls.

- (6) One soldier turns the handcrank clockwise to raise the flat tire just above the carrier while the other soldier holds the tiedown strap to steady the tire.
 - (7) One soldier swings the hoist arm so the flat tire is over the carrier while the other soldier guides the tire with the tiedown strap.
 - (8) Turn the handcrank counterclockwise to lower the flat tire into the carrier.
 - (9) Remove the tiedown strap.
 - (10) One soldier holds the flat tire steady, while the other soldier installs the holddown plate, the lever, and turns the lever clockwise to tighten.
 - (11) Slide the tiedown strap through the wheel.
 - (12) The soldier on the ground connects the tiedown strap to the outside holddown bracket while the soldier on the vehicle connects the tiedown strap to the inside holddown bracket.
 - (13) Pull the latch down on the tiedown strap and lock to secure the flat tire.
 - (14) Turn the handcrank on the hoist arm counterclockwise to loosen the cable.
 - (15) Remove the hook from the lift cable and the lift cable from around the tire.
 - (16) Turn the handcrank clockwise and wind the cable fully onto the reel.
- i. Stow tire davit winch.
- (1) Remove the safety pin and securing pin from the extension.
 - (2) Pull the extension from the hoist arm.
 - (3) Install the extension on the mount.
 - (4) Slide the top of the extension over the stud on the mount.
 - (5) Secure the extension by installing the washer and nut on the stud.
 - (6) Pull the hoist arm from the mount.
 - (7) Put the hoist arm into the mounting bracket.
 - (8) Install the securing pin through the hoist arm and secure with the safety pin.
- j. Prepare vehicle for driving.
- (1) Return all tools and wheel chocks to stowage boxes or locations.
 - (2) Stow vehicle access ladder.
 - (3) Pick up and stow highway safety markers.
 - (4) At the earliest opportunity, have unit maintenance torque all nuts and bolts

that were loosened during the tire changing procedure and repair or replace spare tire.

3. Practical exercise:
 - a. Assign two students to each vehicle and issue TM 9-2320-279-10-1.
 - b. Students practice changing simulated flat tires.
4. Evaluation: Check each student's performance.
5. Summary:
 - a. Recap main points.
 - b. Allow for questions.
 - c. Clarify questions.
 - d. Give closing statement.
6. Retraining: Retrain NO-GOs and slow learners.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when vehicles are parked or maintenance is to be performed.
2. Ensure the transmission is in N, the parking brake is set, and the engine is shut off before leaving the vehicle, when the vehicle is parked, or maintenance is being performed.
3. Ensure all personnel remove all wristwatches, rings, bracelets, neck chains, and any other jewelry before working in or around the HEMTT.
4. Ensure all personnel pay particular attention to the cautions and warnings listed in the operator's manuals.
5. Ensure the driver and ground guides know and understand the hand and arm signals, especially the signal to stop, as outlined in FM 21-305.
6. Ensure ground guide(s) are used when backing.
7. Ensure all backing is conducted at a speed of 5 MPH or less.
8. Do not park the vehicle on a steep grade. Serious injury or death can result or the vent on the M978 tanker may leak.
9. Ensure all personnel wear hearing protection when working in or around a running HEMTT.
10. Ensure all occupants wear seat belts while the vehicle is in operation.
11. Ensure personnel maintain at least three points of contact when mounting or dismounting the vehicle (to include performing PMCS).

12. The vehicle access ladder must be used when performing maintenance. The two hooks on the ladder must be installed in the front skid plate holes, right front fender holes, or left front fender holes as required. When installing or removing the access ladder to or from the right front fender holes, do not hit the fuel-water separator. Hitting the fuel-water separator could cause the glass to break.

13. The vehicle access ladder must be used to mount or dismount the HEMTT cargo body. Install the access ladder in the right front fender holes, climb the ladder, and step into the cargo bed from the right fender.

14. Ensure all personnel are clear of vehicle before engine start is attempted. Operator must visually check to see that all areas of the truck are clear of personnel before attempting to start the engine. Failure to do so could result in serious injury or death to personnel.

15. Stand clear of the tire when raising or lowering. Do not let the tire hang in midair for a long period of time. Place the tire on the carrier or on the ground as soon as possible. The tire is very heavy and could cause serious injury or death if it falls.

16. One soldier should steady the tire during removal. A falling tire may cause injury or death.

17. The tire assembly is very heavy. Do not try to lift or catch the tire assembly. Injury to personnel could result.

18. Ensure all personnel wear protective gloves at all times when handling the spare tire winch cable. The cable may fray and injury to personnel may result.

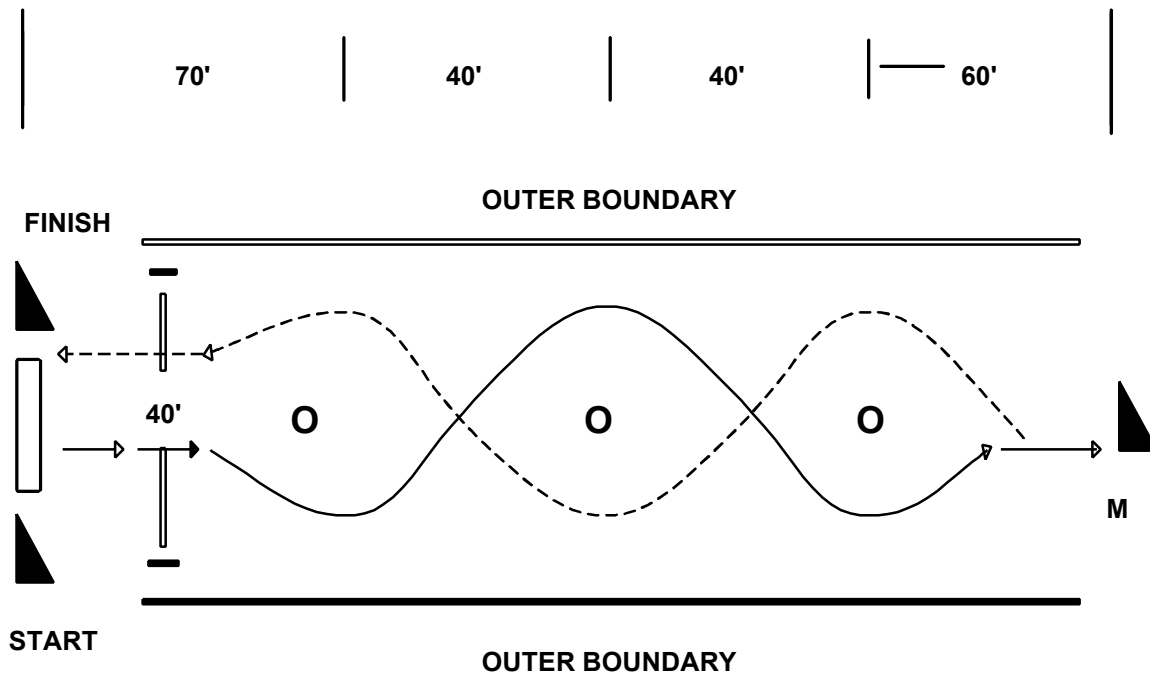
19. Jack is under heavy pressure. Keep hand, arm, and head clear while slowly raising or lowering jack to avoid injury to personnel. Do not lower jack too quickly as tire could fall, causing serious injury or death.

F. **ADDITIONAL COMMENTS AND INFORMATION.** Recommended instructional time is 4.0 hours (1.0 demonstration and 3.0 practical exercise).

CHAPTER

HEMTT SAMPLE TRAINING

HEMTT SERPENTINE COURSE



KEY:

▲ STANDARD (WIDTH BETWEEN STANDARDS IS 20')

O POL DRUM

M MIDPOINT

→ FORWARD

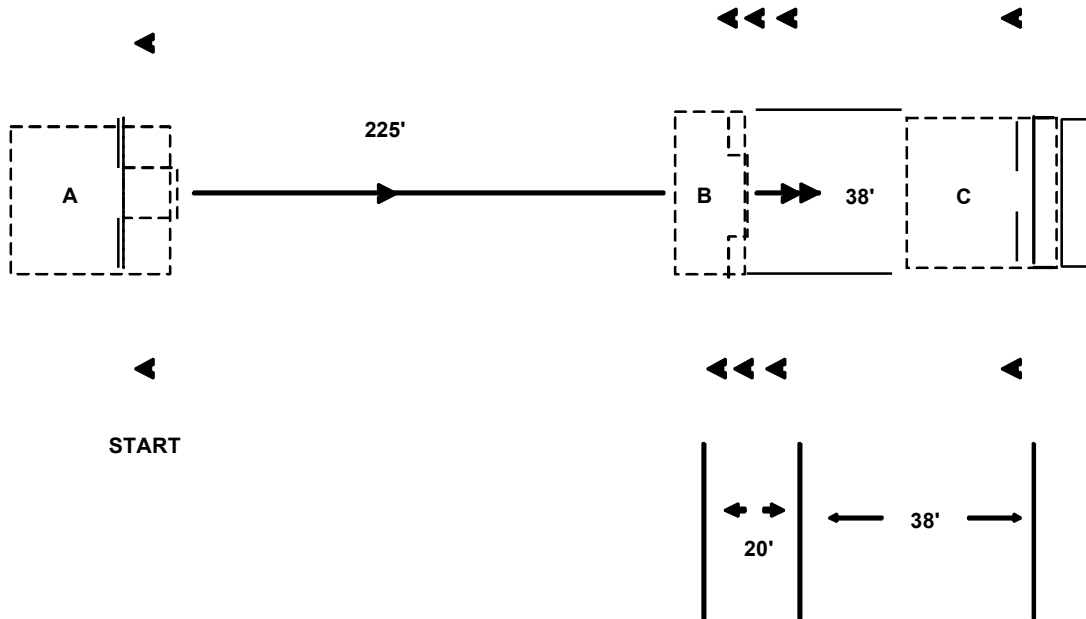
←----- BACKING

▭ START AND FINISH

MINIMUM SIZE OF AREA IS 250' LONG AND 40' WIDE

FIGURE 5-1

STOPPING WITHIN PRESCRIBED LIMITS



KEY :

■ STOP LINE

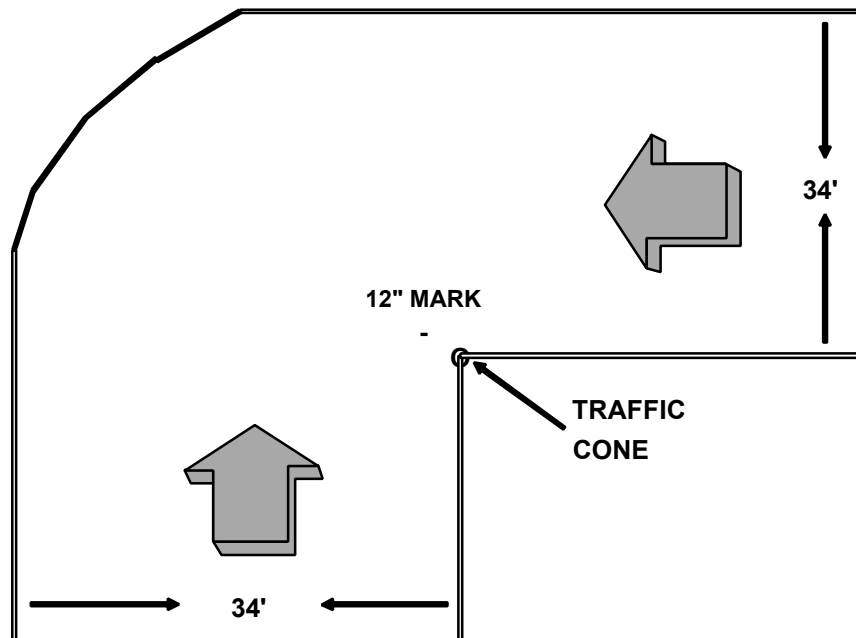
▲ STANDARD (DISTANCE BETWEEN STANDARDS IS 12')

→ FORWARD

NOTE: THE DRIVER PULLS OUT AT POINT A. HIS SPEED AT POINT B SHOULD BE 10 MPH W/TRUCK LOADED AND 20 MPH W/TRUCK EMPTY. HE APPLIES HIS BRAKES AT POINT B AND MUST STOP BEFORE REACHING POINT C.

FIGURE 5-2

HEMTT LEFT AND RIGHT TURNS



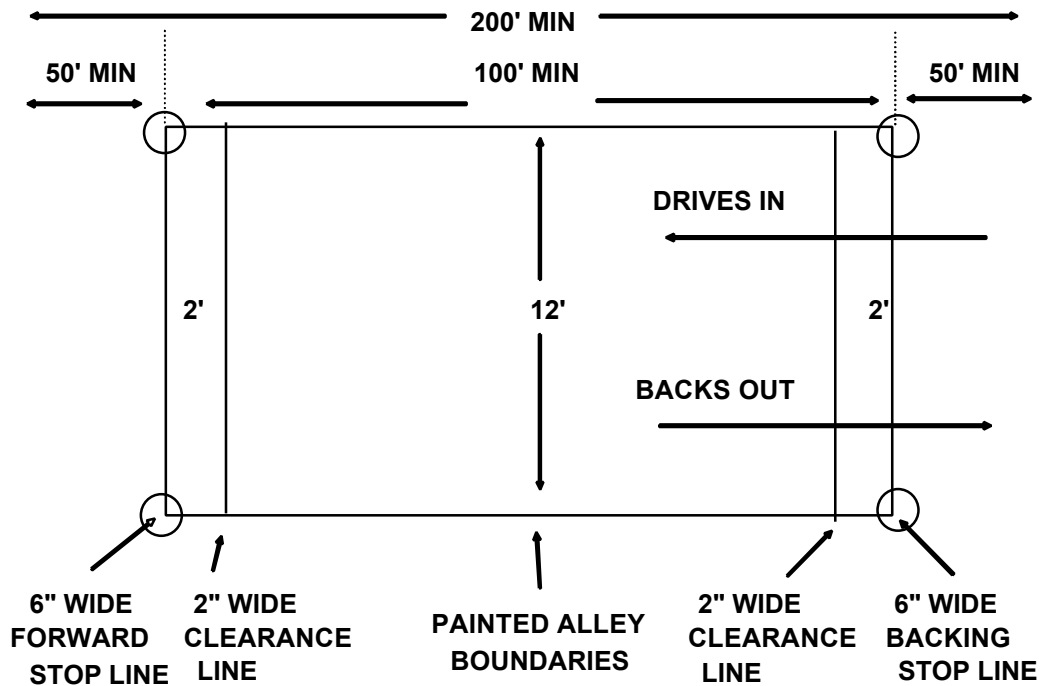
NOTES:

ONE TRAINING AREA MAY BE USED FOR BOTH MANEUVERS, BUT THE MANEUVERS MUST BE DONE SEPARATELY, SUCH AS ALL STUDENTS DOING THE RIGHT TURN FIRST, THEN THE LEFT TURN.

THE ACCEPTABLE STANDARD IS, THE REAR WHEELS OF THE TRUCK MUST BE WITHIN 12" OF THE CONE, WITHOUT HITTING THE CONE OR GOING OVER THE OUTER BOUNDARIES.

FIGURE 5-3

HEMTT FORWARD STOP/STRAIGHT LINE BACKING



NOTES:

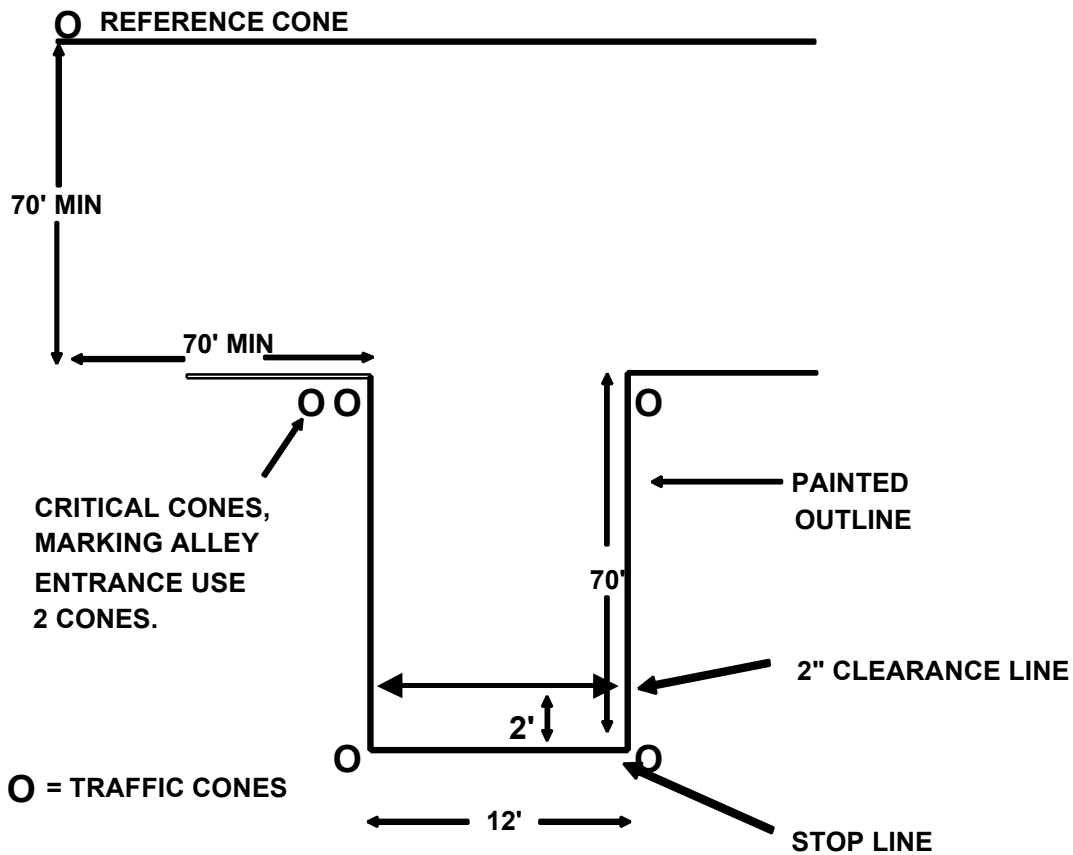
○ = TRAFFIC CONES

SCORING STANDARD FOR THE FORWARD STOP IS THE DRIVER DRIVES THROUGH THE ALLEY AND STOPS SO THAT THE FRONT OF THE TRUCK IS BETWEEN THE CLEARANCE LINE AND THE STOP LINE, WITHOUT HITTING ANY CONES OR TOUCHING THE BOUNDARIES.

SCORING STANDARD FOR THE STRAIGHT LINE BACKING IS THE DRIVER BACKS HIS VEHICLE OUT OF THE ALLEY AND STOPS WHEN THE FRONT OF THE TRUCK IS BETWEEN THE STOP LINE AND THE CLEARANCE LINE WITHOUT HITTING ANY CONES OR TOUCHING ANY BOUNDARIES.

FIGURE 5-4

HEMTT ALLEY DOCK



NOTES:

THE DRIVER WILL DRIVE FORWARD TO THE LEFT SIDE OF THE REFERENCE CONE, WITHOUT GOING PAST THE OUTER BOUNDARIES, KEEPING THE ALLEY ENTRANCE ON HIS LEFT SIDE. HE WILL THEN BACK IN A CURVED PATH INTO THE ALLEY.

SCORING STANDARD IS TO BACK INTO THE ALLEY, WITHOUT HITTING ANY CONES OR TOUCHING ANY BOUNDARIES, AND STOP WITH THE REAR OF THE TRUCK BETWEEN THE STOP AND CLEARANCE LINES, WITH NO MORE THAN 2 PULL-UPS.

FIGURE 5-5

HEMTT DIMINISHING CLEARANCE

MINIMUM LENGTH IS 218' AND MINIMUM WIDTH IS 100'

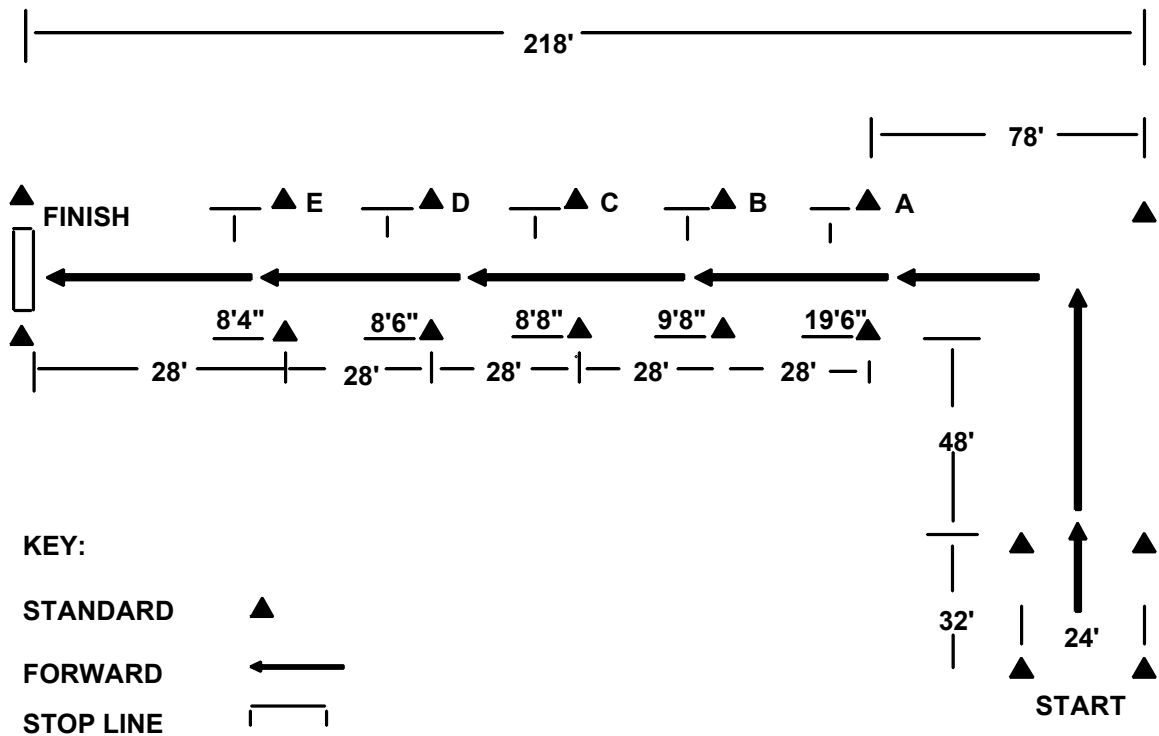
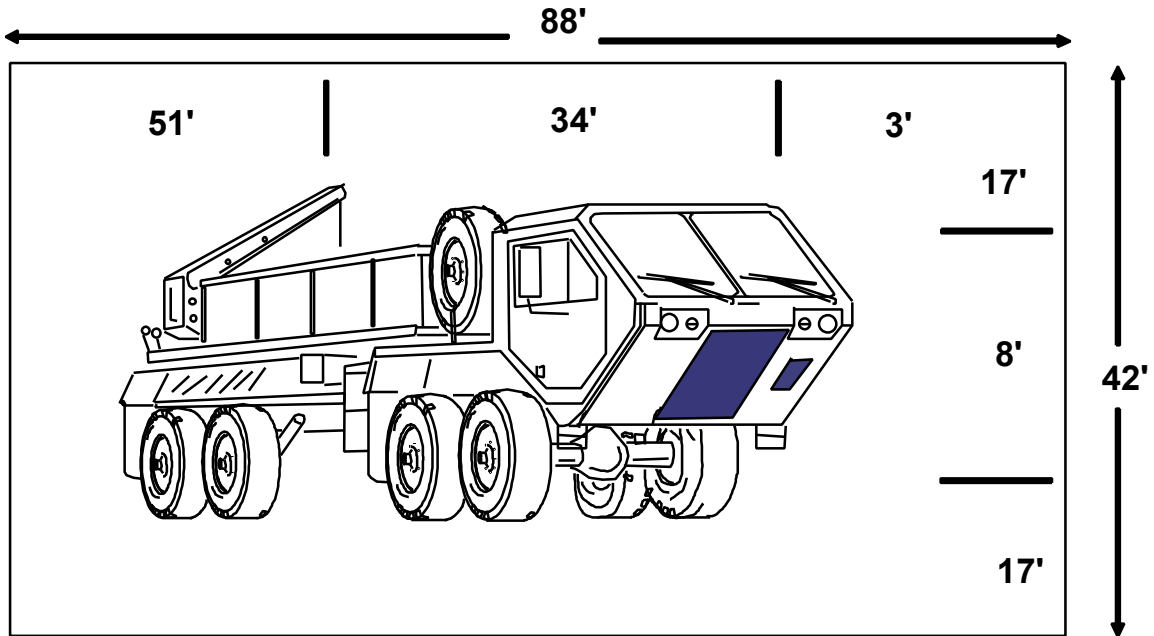


FIGURE 5-6

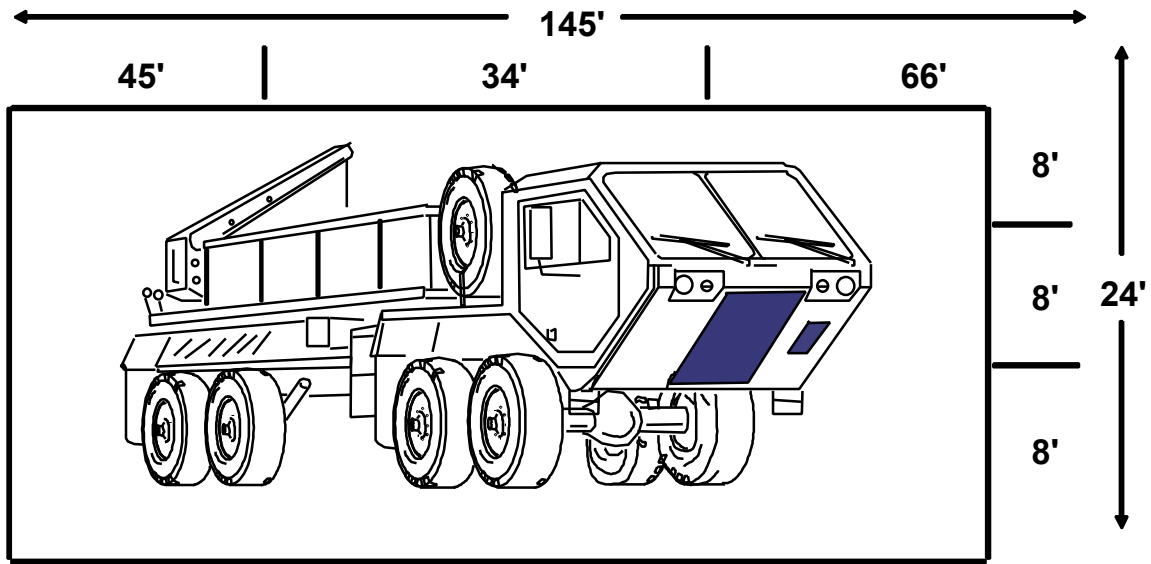
HEMTT CRANE OPERATION



AREA DESIGNED FOR SINGLE VEHICLE OPERATION

FIGURE 5-8

HEMTT SELF-RECOVERY AREA



AREA DESIGNED FOR SINGLE VEHICLE OPERATION

FIGURE 5-9

CHAPTER 6

END OF COURSE COMPREHENSIVE TEST (EOCCT)

LESSON TITLE: END OF COURSE COMPREHENSIVE TEST (EOCCT)

TASK NUMBER: All previously taught tasks.

A. TRAINING OBJECTIVE.

TASK: Pass the EOCCT.

CONDITION: Given an examination booklet, pencil, DD Form 1970, DA Form 2404, TM 9-2320-279-10-1, equipment records folder, rags, lubricants, coolant, an M977/M978 HEMTT with BII, securely tied down palletized load for the M977 or liquid load for the M978, road test route, and a suitable off road training area.

STANDARDS: Pass all written and performance tests.

B. INTERMEDIATE TRAINING.

Intermediate Training Objective 1

TASK: Pass a written examination.

CONDITION: Given an examination booklet and pencil.

STANDARDS: Answer correctly 21 of 30 questions within 40 minutes. Use either the primary written test or the alternate written test.

Intermediate Training Objective 2

TASK: Pass the driver's road test.

CONDITION: Given DD Form 1970, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, lubricants, coolant, road test route, an M977/M978 HEMTT with BII, securely tied down palletized load for the M977 or liquid load for the M978, and road test route.

STANDARDS: Achieve a score of 75 or higher. Use the driver's performance test (road test) instructions and the driver's road test score sheet (DA Form 6125-R).

Intermediate Training Objective 3

TASK: Drive the M977/M978 HEMTT off road.

CONDITION: Given DD Form 1970, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, lubricants, coolant, a suitable off road training area, an M977/M978 HEMTT with BII, securely tied down palletized load for the M977 or liquid load for the M978, and a requirement to operate the truck off road (to include ditches, marshes, gullies, ravines, steep grades, woods, mud, rocky terrain, and shallow streams [48 inches or less]) during daylight hours.

STANDARDS: Operate the vehicle safely at reduced speeds, taking precautions not to damage the truck while driving over rough terrain and receive all GOs on the performance test checklist.

C. ADMINISTRATIVE INSTRUCTIONS.

1. Training time: As scheduled.
2. Training location: Classroom, motor pool, road test route, and off road training area(s) as scheduled.
3. Training type: Performance evaluation.
4. Students: Personnel as scheduled.
5. Principal and assistant instructors required: One primary instructor for the class for the written tests and one assistant instructor for every student for the performance tests.
6. Training aids and equipment: Rags, lubricants, coolant, examination booklet, pencil, DD Form 1970, DA Form 2404, DA Form 6125-R, TM 9-2320-279-10-1, equipment records folder, an M977/M978 HEMTT with BII, and securely tied down palletized load for the M977 or liquid load for the M978 for every student.
7. References: AR 385-55, AR 600-55, DA Pamphlet 738-750, FM 21-305, and TM 9-2320-279-10-1.

D. SEQUENCE OF ACTIVITY.

1. Introduction:
 - a. Interest device.
 - b. Tie-in.
 - c. Lesson objective (paragraph A).
 - d. Procedures.
 - (1) Performance testing.
 - (2) Evaluation.
 - (3) Summary.
2. Performance testing:

NOTE: Vehicle loads should be as close to maximum as possible (11 tons for the M977 and 2,500 gallons for the M978).

NOTE: The driver will test in the order listed below and will not do the next test until he successfully passes the previous test.

- a. Intermediate training objective 1 (written test).
 - b. Intermediate training objective 2 (road test).
 - c. Intermediate training objective 3 (off road driving).
3. Evaluation: Check written test results, road test score sheets, and performance test checklists.
4. Summary:
- a. Recap main points.
 - b. Allow for questions.
 - c. Clarify questions.
 - d. Give closing statement.
5. Retraining: Retrain and retest NO-GOs.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when vehicles are parked or maintenance is to be performed.
2. Ensure the transmission is in N, the parking brake is set, and the engine is shut off before leaving the vehicle, when the vehicle is parked, or maintenance is being performed.
3. Ensure all personnel remove all wristwatches, rings, bracelets, neck chains, and any other jewelry before working in or around the HEMTT.
4. Ensure all personnel pay particular attention to the cautions and warnings listed in the operator's manuals.
5. Ensure the driver and ground guides know and understand the hand and arm signals, especially the signal to stop, as outlined in FM 21-305.
6. Ensure ground guide(s) are used when backing.
7. Ensure all backing is conducted at a speed of 5 MPH or less.
8. Do not park the vehicle on a steep grade. Serious injury or death can result or the vent on the M978 tanker may leak.
9. Ensure all personnel wear hearing protection when working in or around a running HEMTT.
10. Ensure all occupants wear seat belts while the vehicle is in operation.
11. Ensure personnel maintain at least three points of contact when mounting or dismounting the vehicle (to include performing PMCS).

12. The vehicle access ladder must be used when performing maintenance. The two hooks on the ladder must be installed in the front skid plate holes, right front fender holes, or left front fender holes as required. When installing the access ladder on the right front fender, do not hit the fuel-water separator. Hitting the fuel-water separator could cause the glass to break.

13. Ensure all personnel are clear of vehicle before engine start is attempted. Operator must visually check to see that all areas of the truck are clear of personnel before attempting to start the engine. Failure to do so could result in serious injury or death to personnel.

14. The radiator is very hot and pressurized during vehicle operation. Let the radiator cool before removing the cap. Failure to comply can result in serious burns.

15. The exhaust pipe and muffler can become very hot during vehicle operation. Be careful not to touch these parts with bare hands or allow the body to come in contact with the exhaust pipe or muffler. Exhaust system parts can become hot enough to cause serious burns.

16. Be careful not to short out battery terminals. Do not smoke or use open flame near batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes.

17. Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep a fire extinguisher within easy reach when working with fuel. Do not work on the fuel system when the engine is hot. Fuel can be ignited by the hot engine. When working with fuel, post signs that read: "NO SMOKING WITHIN 50 FEET OF VEHICLE".

18. Apply brakes gradually when stopping. A panic stop will cause the vehicle wheels to lock, engine to stall, and power steering failure. Failure to do this can result in injury or death.

19. Rapid operation repeatedly of service brakes will consume compressed air supply and cause automatic spring brake application. Failure to follow proper service brake operating procedures may cause serious injury or death to personnel.

20. Never use the parking brake for normal braking. The wheels will lock up causing a severe skid. A skidding vehicle could result in serious injury or death.

21. Excessive use of the service brake to control downhill speed will result in the loss of braking power because of heat buildup.

22. Apply the engine brake only when vehicle tires have good traction. Use of the engine brake on slippery surfaces can cause the vehicle to skid and cause injury to personnel.

F. **ADDITIONAL COMMENTS AND INFORMATION.** Recommended testing time is 4.0 hours.

INTERMEDIATE TRAINING OBJECTIVE 1

WRITTEN TEST (PRIMARY)

NAME _____ RANK _____ DATE _____

Instructions for Test

- A. This test consists of 30 multiple choice questions.
- B. Read all questions and answers carefully; then write the answer that is MOST correct on the blank line to the left.
- C. Any unanswered questions will be scored as incorrect responses.

- _____ 1. How many positions are on the engine start switch?
- a. 1.
 - b. 2.
 - c. 3.
 - d. 4.
- _____ 2. To what position do you set the engine (Jacobs) brake HI/LO switch if more braking is required?
- a. LOW.
 - b. MIDDLE.
 - c. HIGH.
 - d. SUPER HIGH.
- _____ 3. What should you do if the HEMTT accidentally enters water deeper than 4 feet?
- a. Press on the brake pedal and hold to stop the vehicle.
 - b. Set the transmission range selector to "R".
 - c. Let up on the brake pedal and slowly back the vehicle out of deep water.
 - d. In sequence, do a, b, and c above.

- _____ 4. What should you do for maximum use of brakes?
- a. Use the wheel brakes.
 - b. Use the engine brake.
 - c. Neither a or b.
 - d. Use both the engine and the wheel brakes.
- _____ 5. What should you do if your vehicle starts to skid?
- a. Release the accelerator pedal and steer in the direction of the skid.
 - b. Release the gas pedal and steer in the opposite direction of the skid.
 - c. Step on the brakes and hold the steering wheel straight.
 - d. Nothing.
- _____ 6. The air filter restriction indicator shows the condition of the air filter. What color does the indicator window show as the filter becomes restricted?
- a. Red.
 - b. Green.
 - c. Blue.
 - d. Yellow.
- _____ 7. When doing after-operation PMCS you see contaminated fuel in the fuel-water separator. What should you do with the contaminated fuel?
- a. Drain it on the ground.
 - b. Drain it on the wash rack.
 - c. Drain it into a suitable container.
 - d. Nothing, continue to operate your vehicle until your platoon sergeant has time to drain the contaminated fuel.
- _____ 8. Shut off the engine and notify organizational maintenance if the RED and GREEN needles on the air pressure gauge does not read between how many psi after warm up?
- a. 40 to 60.
 - b. 60 to 80.
 - c. 60 to 120.
 - d. None of the above.

- _____ 9. What is the maximum number of times you should push the ether start button in a single starting attempt?
- a. 1.
 - b. 2.
 - c. 3.
 - d. 4.
- _____ 10. At what speed do you move the transfer case shift lever?
- a. 3 to 5 MPH.
 - b. 5 to 10 MPH.
 - c. 8 to 12 MPH.
 - d. At a standstill and the transmission is in "N".
- _____ 11. How should you dry wet brake linings?
- a. Continue to drive at a slow speed with enough pressure on the brake pedal to cause a drag on the brakes.
 - b. Pump the brake pedal.
 - c. Pull over and wait 25 to 30 minutes to allow the brakes to dry out.
 - d. Increase speed to allow more air to flow through the brakes.
- _____ 12. What position is the transfer case shift lever in for off-road operation?
- a. Either LO or HI.
 - b. Neither LO nor HI.
 - c. LO.
 - d. HI.
- _____ 13. A ground guide is required when backing a HEMTT because of which of the following?
- a. The driver has limited vision to the rear.
 - b. The driver has a lot of experience.
 - c. The ground guide needs the practice.
 - d. None of the above.

- _____ 14. Do not hold the steering wheel to the full left or right position for longer than how many seconds?
- a. 26.
 - b. 24.
 - c. 15.
 - d. 10.
- _____ 15. The HEMTT can ford water up to how many feet deep?
- a. 2.
 - b. 4.
 - c. 6.
 - d. 8.
- _____ 16. The tire davit is used to do which of the following?
- a. Check the tire pressure.
 - b. Assist in lifting a flat tire from the hub.
 - c. Lower and raise the spare tire.
 - d. Tighten lug nuts.
- _____ 17. When driving down a steep grade the engine (Jacobs) brake operates best when the engine speed is between what RPM?
- a. 1,600 to 1,800.
 - b. 1,650 to 2,100.
 - c. 2,100 to 2,350.
 - d. 2,200 to 2,600.
- _____ 18. What should you do if you are driving down a steep grade with a fully loaded HEMTT and your engine speed has gone over 2,100 RPM?
- a. Use the service brakes as needed to slow the vehicle and set the engine (Jacobs) brake switch to HI.
 - b. Set the transmission range selector to a lower range.
 - c. Set the transmission range selector to "N".
 - d. Press the service brake pedal hard three or four times in a row.

- _____ 19. Before shutting the engine down, run the engine at a reduced speed (800 to 1,000 RPM) for how many minutes?
- a. 1 to 3.
 - b. 2 to 4.
 - c. 3 to 5.
 - d. 4 to 8.
- _____ 20. The HEMTT automatic transmission is equipped with which of the following that automatically engages after the load is rolling and torque demand is low?
- a. A centrifugal coolant fan.
 - b. A lockup clutch.
 - c. A 90:1 ratio torque convertor.
 - d. An inverted flywheel.
- _____ 21. What should you do when you encounter oncoming traffic on a narrow tank trail?
- a. Speed up.
 - b. Continue at current speed and move to the right of the road.
 - c. Move as far to the right as safely possible, stop, and wait until the other vehicles have passed.
 - d. Do nothing.
- _____ 22. What should you do for maximum traction when driving off road?
- a. Set the transfer case shift lever to LO.
 - b. Set the traction control lever to INTER-AXLE DIFF. LOCK.
 - c. Set the traction control lever to 8X8 drive.
 - d. Set the transfer case shift lever to LO and the traction control lever to INTER-AXLE DIFF. LOCK.
- _____ 23. When does the 8X8 drive indicator on the instrument panel light up orange?
- a. The traction control is in the INTER-AXLE DIFF. LOCK position.
 - b. The traction control is in the 8X8 drive position.
 - c. The transfer case shift lever is in LO.
 - d. Whenever the traction control is in the 8X8 drive position or the transfer case shift lever is in LO.

- _____ 24. What should the HEMTT speed be when fording water?
- a. 10 to 15 MPH or less.
 - b. 5 to 10 MPH or less.
 - c. 3 to 4 MPH or less.
 - d. At any speed less than the posted speed limit.
- _____ 25. How much distance must you maintain between vehicles when driving during periods of reduced visibility?
- a. Same distance.
 - b. Double the normal distance.
 - c. Three times the normal distance.
 - d. Two times the speed in feet.
- _____ 26. When should you use the engine (Jacobs) brake?
- a. Going up steep grades.
 - b. Going down steep grades.
 - c. On snow and ice.
 - d. On rain-soaked roads.
- _____ 27. What should you do when driving through deep ruts?
- a. Turn wheels right.
 - b. Turn wheels left.
 - c. Keep wheels straight.
 - d. Let go of the steering wheel.
- _____ 28. What should you always do when parking the vehicle?
- a. Put the transmission in "P".
 - b. Pull the parking brake.
 - c. Pull the parking brake, then put the transmission in "N".
 - d. Idle the engine for 10 minutes.

- _____ 29. When must seat belts be worn?
- a. Only when on rough, cross-country terrain.
 - b. Whenever operating the truck.
 - c. Only when operating on public roads and highways.
 - d. Only in winter.
- _____ 30. The vehicle access ladder must be used when performing maintenance. What must you be careful not to damage when installing the access ladder to the right front fender holes?
- a. The muffler.
 - b. The fuel-water separator.
 - c. The engine access cover.
 - d. The vehicle batteries.

INTERMEDIATE TRAINING OBJECTIVE 1
WRITTEN TEST ANSWER SHEET (PRIMARY)

- | | | | |
|-----|---|-----|---|
| 1. | c | 16. | c |
| 2. | c | 17. | b |
| 3. | d | 18. | a |
| 4. | d | 19. | c |
| 5. | a | 20. | b |
| 6. | d | 21. | c |
| 7. | c | 22. | d |
| 8. | c | 23. | d |
| 9. | c | 24. | c |
| 10. | d | 25. | b |
| 11. | a | 26. | b |
| 12. | a | 27. | c |
| 13. | a | 28. | c |
| 14. | d | 29. | b |
| 15. | b | 30. | b |

INTERMEDIATE TRAINING OBJECTIVE 1

WRITTEN TEST (ALTERNATE)

NAME _____ RANK _____ DATE _____

Instructions for Test

- A. This test consists of 30 multiple choice questions.
- B. Read all questions and answers carefully; then write the answer which is MOST correct on the blank line to the left.
- C. Any unanswered questions will be scored as incorrect responses.

- _____ 1. The vehicle access ladder must be used when performing maintenance. What must you be careful not to damage when installing the access ladder to the right front fender holes?
- a. The muffler.
 - b. The fuel-water separator.
 - c. The engine access cover.
 - d. The vehicle batteries.
- _____ 2. When must seat belts be worn?
- a. Whenever operating the truck.
 - b. Only when on rough, cross-country terrain.
 - c. Only when operating on public roads and highways.
 - d. Only in winter.
- _____ 3. What should you always do when parking the vehicle?
- a. Put the transmission in "P".
 - b. Pull the parking brake.
 - c. Pull the parking brake, then put the transmission in "N".
 - d. Idle the engine for ten minutes.

- _____ 4. What should you do when driving through deep ruts?
- a. Turn wheels right.
 - b. Turn wheels left.
 - c. Keep wheels straight.
 - d. Let go of the steering wheel.
- _____ 5. When should you use the engine (Jacobs) brake?
- a. Going up steep grades.
 - b. Going down steep grades.
 - c. On snow and ice.
 - d. On rain-soaked roads.
- _____ 6. How much distance must you maintain between vehicles when driving during periods of reduced visibility?
- a. Same distance.
 - b. Double the normal distance.
 - c. Three times the normal distance.
 - d. Two times the speed in feet.
- _____ 7. What should the HEMTT speed be when fording water?
- a. 10 to 15 MPH or less.
 - b. 5 to 10 MPH or less.
 - c. 3 to 4 MPH or less.
 - d. At any speed less than the posted speed limit.
- _____ 8. The tire davit is used to do which of the following?
- a. Check the tire pressure.
 - b. Assist in lifting a flat tire from the hub.
 - c. Lower and raise the spare tire.
 - d. Tighten lug nuts.

- _____ 9. What should you do for maximum traction when driving off road?
- Set the transfer case shift lever to LO.
 - Set the traction control lever to INTER-AXLE DIFF. LOCK.
 - Set the traction control lever to 8X8 drive.
 - Set the transfer case shift lever to LO and the traction control lever to INTER-AXLE DIFF. LOCK.
- _____ 10. What should you do when you encounter oncoming traffic on a narrow tank trail?
- Speed up.
 - Continue at current speed and move to the right of the road.
 - Move as far to the right as safely possible, stop, and wait until the other vehicles have passed.
 - Do nothing.
- _____ 11. The HEMTT automatic transmission is equipped with which of the following that automatically engages after the load is rolling and torque demand is low?
- A centrifugal coolant fan.
 - A lockup clutch.
 - A 90:1 ratio torque convertor.
 - An inverted flywheel.
- _____ 12. Before shutting the engine down, run the engine at a reduced speed (800 to 1,000 RPM) for how many minutes?
- 1 to 3.
 - 2 to 4.
 - 3 to 5.
 - 4 to 8.

- _____ 13. What should you do if you are driving down a steep grade with a fully loaded HEMTT and your engine speed has gone over 2,100 RPM?
- a. Use the service brakes as needed to slow the vehicle and set the engine (Jacobs) brake switch to HI.
 - b. Set the transmission range selector to a lower range.
 - c. Set the transmission range selector to “N”.
 - d. Press the service brake pedal hard three or four times in a row.
- _____ 14. When driving down a steep grade, the engine (Jacobs) brake operates best when the engine speed is between what RPM?
- a. 1,600 to 1,800.
 - b. 1,650 to 2,100.
 - c. 2,100 to 2,350.
 - d. 2,200 to 2,600.
- _____ 15. A ground guide is required when backing a HEMTT because of which of the following?
- a. The driver has limited vision to the rear.
 - b. The driver has a lot of experience.
 - c. The ground guide needs the practice.
 - d. None of the above.
- _____ 16. The HEMTT can ford water up to how many feet deep?
- a. 2.
 - b. 4.
 - c. 6.
 - d. 8.
- _____ 17. When does the 8X8 drive indicator on the instrument panel light up orange?
- a. The traction control is in the INTER-AXLE DIFF. LOCK position.
 - b. The traction control is in the 8X8 drive position.
 - c. The transfer case shift lever is in LO.
 - d. Whenever the traction control is in the 8X8 drive position or the transfer case shift lever is in LO.

- _____ 18. Do not hold the steering wheel to the full left or right position for longer than how many seconds?
- a. 26.
 - b. 24.
 - c. 15.
 - d. 10.
- _____ 19. What position is the transfer case shift lever in for off-road operation?
- a. Either LO or HI.
 - b. Neither LO nor HI.
 - c. LO.
 - d. HI.
- _____ 20. How should you dry wet brake linings?
- a. Continue to drive at a slow speed with enough pressure on the brake pedal to cause a drag on the brakes.
 - b. Pump the brake pedal.
 - c. Pull over and wait 25 to 30 minutes to allow the brakes to dry out.
 - d. Increase speed to allow more air to flow through the brakes.
- _____ 21. At what speed do you move the transfer case shift lever?
- a. 3 to 5 MPH.
 - b. 5 to 10 MPH.
 - c. 8 to 12 MPH.
 - d. At a standstill and the transmission is in "N".
- _____ 22. What is the maximum number of times you should push the ether start button in a single starting attempt?
- a. 1.
 - b. 2.
 - c. 3.
 - d. 4.

- _____ 23. Shut off the engine and notify organizational maintenance if the RED and GREEN needles on the air pressure gauge does not read between how many psi after warm up?
- a. 40 to 60.
 - b. 60 to 80.
 - c. 60 to 120.
 - d. None of the above.
- _____ 24. When doing after-operation PMCS you see contaminated fuel in the fuel-water separator. What should you do with the contaminated fuel?
- a. Drain it on the ground.
 - b. Drain it on the wash rack.
 - c. Drain it into a suitable container.
 - d. Nothing, continue to operate your vehicle until your platoon sergeant has time to drain the contaminated fuel.
- _____ 25. The air filter restriction indicator shows the condition of the air filter. What color does the indicator window show as the filter becomes restricted?
- a. Red.
 - b. Green.
 - c. Blue.
 - d. Yellow.
- _____ 26. What should you do if your vehicle starts to skid?
- a. Release the accelerator pedal and steer in the direction of the skid.
 - b. Release the gas pedal and steer in the opposite direction of the skid.
 - c. Step on the brakes and hold the steering wheel straight.
 - d. Nothing.
- _____ 27. What should you do for maximum use of brakes?
- a. Use the wheel brakes.
 - b. Use the engine brake.
 - c. Neither a or b.
 - d. Use both the engine and the wheel brakes.

- _____ 28. What should you do if the HEMTT accidentally enters water deeper than 4 feet?
- a. Press on the brake pedal and hold to stop the vehicle.
 - b. Set the transmission range selector to "R".
 - c. Let up on the brake pedal and slowly back the vehicle out of deep water.
 - d. In sequence, do a, b, and c above.
- _____ 29. To what position do you set the engine (Jacobs) brake HI/LO switch if more braking is required?
- a. LOW.
 - b. MIDDLE.
 - c. HIGH.
 - d. SUPER HIGH.
- _____ 30. How many positions are on the engine start switch?
- a. 1.
 - b. 2.
 - c. 3.
 - d. 4.

INTERMEDIATE TRAINING OBJECTIVE 1
WRITTEN TEST ANSWER SHEET (ALTERNATE)

- | | | | |
|-----|---|-----|---|
| 1. | b | 16. | b |
| 2. | a | 17. | d |
| 3. | c | 18. | d |
| 4. | c | 19. | a |
| 5. | b | 20. | a |
| 6. | b | 21. | d |
| 7. | c | 22. | c |
| 8. | c | 23. | c |
| 9. | d | 24. | c |
| 10. | c | 25. | d |
| 11. | b | 26. | a |
| 12. | c | 27. | d |
| 13. | a | 28. | d |
| 14. | b | 29. | c |
| 15. | a | 30. | c |

INTERMEDIATE TRAINING OBJECTIVE 2

DRIVER'S PERFORMANCE TEST (ROAD TEST) INSTRUCTIONS

1. GENERAL.

a. This test is to be conducted according to the guidelines set forth in AR 600-55. Also, the specific directions for this test are to be followed without deviation. No omissions or changes in the wording of these directions are permitted.

b. The purpose of the road test is to evaluate the driver's ability to drive safely in most on-the-road situations. It serves as the basis for the issuance of an operator's permit and provides a means for instructional reinforcement and counseling. Driving weaknesses that surface as a result of the test should be called to the attention of the examinee so that specific steps can be taken to eliminate these weaknesses.

c. Final evaluations will be recorded on DA Form 348 or on an equivalent official form. Once this transfer of information has been accomplished, the completed DA Form 6125-R will be destroyed.

d. The examiner will be a thoroughly qualified operator of the HEMTT. Furthermore, he will be familiar with the road test route and the testing procedures as set forth in AR 600-55 and this TC. Before administering the test to any examinees, he must practice administering the test to a regular licensed driver qualified on the HEMTT. This practice administration will help him become acquainted with the test route and testing procedures.

e. The road test will consist of three scored phases: the PMCS test, the vehicle control test, and the on-the-road driving test. The driver will be tested on these phases in the order listed and will not move on to the next phase until successfully passing the previous phase. If the driver fails any phase of the test, the entire road test will be terminated at that point and the examiner will annotate the DA Form 6125-R and conduct an AAR with the driver. This procedure will help to ensure that only safe and proficient drivers get behind the wheel of the HEMTT.

2. SETTING UP THE ROAD TEST. For the road test the driver drives a predetermined route. To set up the test, the examiner must plan the route to be used. Once a route is established (in a given locality) it should be used for all examinees who are to be tested in the HEMTT. Should it prove necessary to vary the route, care should be taken that the different kinds of route requirements, as well as the number of requirements, remain the same. Every road test route will meet the following requirements (to the extent possible):

a. An area to conduct PMCS.

(1) The site should be a flat parking area suitable for heavy vehicles.

(2) There should be at least 8 feet of open space around the vehicle. This will give the driver room to conduct the inspection and the examiner room to observe the driver's inspection performance.

(3) The site should be quiet enough that the examiner can hear the driver explain what he is doing during the inspection.

(4) Avoid using a parking space on a street or any place where traffic is passing close by.

- b. A vehicle control test area with the following maneuvers:
- (1) Forward stop (see Figure 5-4). Pull vehicle forward through a straight alley and then stop the vehicle so that the frontmost part of the vehicle is within 2 feet of the forward stop line.
 - (2) Straight line backing (see Figure 5-4). Back the vehicle through a straight alley and then stop the vehicle so that the frontmost part of the vehicle is within 2 feet of the stop line.
 - (3) Right turn (see Figure 5-3). Drive the vehicle forward about 30 to 50 feet, and then turn the vehicle right around a cone or other point. Bring the rear tires of the vehicle within 18 inches from the cone without touching it.
 - (4) Alley dock (see Figure 5-5). Pull the vehicle forward past the alley, keeping the alley entrance on the left. Back in a curved path into the alley without touching the sides, and stop the rear of the vehicle within 2 feet of the stop line at the rear of the alley.
- c. On-the-road driving test with the following maneuvers:
- (1) Eight left turns and eight right turns. Include turns at traffic lights, stop signs, and uncontrolled intersections. The turns should range from easy to somewhat difficult for a heavy vehicle. Get a mixture of types of intersections so that they vary in complexity.
 - (2) A straight section of urban business streets. The section should be 1 to 2 miles long with moderate traffic density. It should contain through intersections and intersections with traffic lights. Try to get a section where the driver can make lane changes somewhere along the route. The section should be one that lets the examiner see how the driver copes with traffic in a typical business area.
 - (3) Two through intersections and two intersections where a stop has to be made. If possible, these intersections should be included in the urban section.
 - (4) Two railway crossings. Try to get at least one uncontrolled crossing. The crossing should have enough sight distance for the examiner to see if the driver makes head search movements when approaching each crossing. The driver's attempt to look left and right down the track will often be the only way to tell if the driver noticed the crossing. If the area does not have any railway crossings, simulate this exercise.
 - (5) Two curves, one to the left and one to the right. Try to get curves tight enough to produce noticeable off-tracking.
 - (6) A two-lane rural or semirural road. This section should be about 2 miles long. If there is no rural road near the motor pool, an industrial street with few entrances and a higher speed limit is a good substitute. An undeveloped suburban road is another good substitute. In general, use any road that has characteristics similar to a rural road.
 - (7) A section of expressway. The section should start with a conventional ramp entrance and end with a conventional ramp exit. The section should be long enough for the HEMTT to make two lane changes. A section of four-lane highway can be used if there is no expressway available.

(8) A downgrade. The grade should be steep enough and long enough to require gearing down and braking. A steep short hill is the next best choice if a long grade cannot be found. If the local area does not have any steep grades, simulate this exercise.

(9) An upgrade. The grade should be steep enough and long enough to require gear changing to maintain speed. A steep short hill is the next best choice if a long grade cannot be found. If it is hard to find steep grades in the local area, use the same grade for both the downgrade and the upgrade.

(10) A downgrade for stopping. This is a grade where a vehicle can safely stop (or pull off) and park for a minute or so. The grade needs only to be steep enough to cause a vehicle to roll if the driver does not park properly. If the local area does not have any steep grades, simulate this exercise.

(11) An upgrade for stopping. This is another grade where a vehicle can safely stop and park for a minute or so. If needed, use the same grade as was used for the downgrade stop.

(12) One underpass or low clearance and one bridge. The underpass should have a posted clearance height. The bridge should have a posted weight limit. If the local area does not have underpasses or bridges with posted limits, use ones that do not have posted limits. If needed, substitute a bridge for an underpass or an underpass for a bridge. If the local area does not have any low clearances or bridges, look for places that have signs a HEMTT driver should see. Examples of such signs are “No Commercial Vehicles after 11:00 PM” or “Bridge with 12 Ton Weight Limit in 2 Miles.”

d. Route design.

(1) When designing a route, try to include all of the specified maneuvers. If there is not an ideal example for a maneuver, find the closest substitute. Do not drop a maneuver because there is not an ideal example of it. The important thing is to have a route that tests the driver in as wide a variety of situations as possible.

(2) There is no minimum length for a route and no minimum amount of time that a route must take. A route is acceptable whenever it has all the specified maneuvers. It is a good idea to have at least two routes available so that there is an alternate route if construction or traffic prevents using the primary route.

3. ADMINISTERING THE ROAD TEST.

a. Preventing accidents.

(1) Road tests should normally NOT be given if road or weather conditions present a hazard such as ice, snow, rain, or blowing dust. The exception is when testing is specifically for driving under such conditions.

(2) The examiner must always watch traffic conditions and warn the examinee of dangers which he may not see. If the driver becomes involved in a dangerous or unlawful moving traffic incident or an accident, terminate the test immediately. The examiner will drive the vehicle back to the start point once on-scene responsibilities are fulfilled.

b. Beginning the road test.

(1) Fill in the driver's name and your name (examiner's) on the front of the Road Test Score Sheet. (A sample of a completed DA Form 6125-R is at Figures 6-1 and 6-2). A reproducible DA Form 6125-R is located at the back of AR 600-55. Read the following instructions to the driver at the beginning of the test:

DURING THE ROAD TEST, I WILL GIVE YOU DIRECTIONS AS WE GO ALONG.

I WILL ALWAYS GIVE DIRECTIONS FOR TURNS, AND SO ON, AS FAR IN ADVANCE AS POSSIBLE.

THERE WILL BE NO TRICK DIRECTIONS TO GET YOU TO DO SOMETHING ILLEGAL OR UNSAFE.

KEEP IN MIND THAT YOU ARE ALWAYS IN CHARGE OF THE VEHICLE. DO NOT FOLLOW A DIRECTION IF IT TURNS OUT AT THE LAST MINUTE TO LEAD TO AN UNSAFE ACT.

AS WE GO ALONG, I WILL BE MAKING VARIOUS MARKS ON THE SCORING FORM. WHEN YOU SEE THIS, IT DOES NOT NECESSARILY MEAN YOU HAVE DONE ANYTHING WRONG. IT IS BEST FOR YOU TO CONCENTRATE ON DRIVING AND NOT WORRY ABOUT WHAT I AM DOING.

YOUR SCORED TEST BEGINS WITH BEFORE-OPERATIONS PREVENTIVE MAINTENANCE CHECKS AND SERVICES. IF YOU ARE SUCCESSFUL IN THAT PORTION OF THE TEST, YOU WILL PROCEED TO THE VEHICLE CONTROL TEST, AND FINALLY TO THE ON-THE-ROAD DRIVING TEST.

ARE THERE ANY QUESTIONS?

(2) The road test actually begins when the driver starts his before-operations PMCS. If the driver performs the PMCS to appropriate standards, the examiner will annotate in the Notes section of the DA Form 6125-R "Before-operations PMCS satisfactory." If he does not perform PMCS to the examiner's satisfaction, the examiner will stop the road test at that point and fail the driver. In this situation, the examiner will annotate "Before-operations PMCS unsatisfactory" in the Notes section, list specific deficiencies if any, and refer the driver for further training. The examiner will follow the same procedures for grading during- and after-operations PMCS.

(3) If the driver successfully completes the before- operations PMCS, he will proceed to the vehicle control test. It is important to ensure that the driver is proficient in basic vehicle control skills before taking him on the road with other traffic.

(a) Upon arrival at the vehicle control test site, give the driver an overview of all four exercises (forward stop, straight line backing, right turn, and alley dock). Use a diagram of the site to show the driver what to do, and explain he will get detailed instructions for each exercise as it comes up. When he is ready, the driver gets into the vehicle and proceeds to the first exercise for instructions.

- (b) The examiner will evaluate the exercises from the ground and observe the driver's ability to control the vehicle during each maneuver. If the driver demonstrates satisfactory vehicle control skills, the examiner will indicate in the Notes section "Vehicle control test satisfactory." If the driver is unable to satisfactorily negotiate the course, the examiner will stop the road test and fail the driver at that point. The examiner will indicate in the Notes section "Vehicle control test unsatisfactory," indicate specific weaknesses if any, and refer the driver for further training.
- (4) If the driver satisfactorily completes the vehicle control test, he will proceed to the driving portion of the road test. When the driver is ready, get into the vehicle with the driver and start giving directions for following the road test route. Give the directions in this form: At the (location), make (maneuver). For example, "At the next intersection, turn right," or "At the stop sign, turn left."
- (5) If necessary, give combined directions. For example, "Immediately after you complete your right turn, you will have to turn left into that road over there."
- (6) Avoid using commercial signs or buildings as landmarks for directions unless there is no alternative. Do not assume that the driver is familiar enough with the area that he knows such landmarks.
- (7) Give directions well before the maneuver is to be performed. Always give a direction at a point where the driver can see where he will do the maneuver. However, give the directions close enough to the location so the driver can be sure of where to do the maneuver. For example, do not tell the driver to turn at the next intersection if there is another intersection before the one where you want the driver to turn.
- (8) In addition to directions for getting the driver around the route, there are some directions to give for the expressway, urban straight, and rural sections.
- (a) At the beginning of the expressway section say, "We will be driving along this expressway for about (2 or however many) miles. When it is safe to do so, make a lane change to the left. Then when it is safe to do so, make a lane change to the right."
- (b) At the beginning of the urban straight section, say, "We will be driving along this street for about (2 or however many) miles. When it is safe to do so, make a lane change to the left. Then when it is safe to do so, make a lane change back to the right. When we get near the end of this section, I will tell you what to do next."
- (c) At the beginning of the rural section, say, "We will be driving along this road for about (2 or however many) miles. When we get near the end, I will tell you what to do next."
- (9) In general, give all directions in a way that avoids distracting the driver. Also, avoid unnecessary conversation.

ROAD TEST SCORE SHEET			DATE	
For use of this form, see AR 600-55; the proponent agency is OCSA			23 Feb 95	
NAME OF DRIVER <i>Messkit Johnny J.</i>		NAME OF EXAMINER <i>Smith John B.</i>		
SSAN <i>CC-CC-CCCC</i>	SCORE <i>-20</i>	ROUTE <i>Primary</i>		
STOP/START ON GRADE		EXPRESSWAY		
<u>Approach</u>		<u>Merge On</u>		
	Up Down			
Traffic check	0 0	Traffic check	0	
Signal On	0 0	Signal On	0	
Moves to proper lane	0 0	Maintains spacing	0	
Smooth deceleration	0 0	Avoids stopping	0	
Does not coast to stop	0 0	Smooth merge	0	
		Cancel signal	0	
<u>Stop</u>		<u>Lane Changes</u>		
			Left	Right
Vehicle parallel to curb	0 0	Traffic check	0	0
Vehicle does not roll	0 0	Signal on	0	0
Signal off/4-ways on	0 0	Adequate spacing	0	0
Parking brake on	0 0	Smooth lane change	0	0
		Cancel signal	0	0
<u>Resume</u>		<u>Exit</u>		
Traffic check	0 0	Traffic check	0	
4-ways off/signal on	0 0	Signal on	0	
Release parking brake	0 0	Smooth merge to exit lane	0	
Did not stall engine	0 0	Decelerate in exit lane	0	
Traffic check	0 0	Adequate spacing	0	
Accelerate to traffic flow	0 0	Correct ramp speed	0	
		Cancel signal	0	
SEARCH	0 0	SEARCH	0	
DIRECTION	0 0	DIRECTION	0	
SPEED	0 0	SPEED	0	
No errors	0 0	No errors	0	
DRIVING UP GRADE		GENERAL DRIVING BEHAVIOR		
In proper gear	0	Use clutch properly (to shift, double clutched, didn't ride)	0	
Stays in right lane	0	Used gears properly (not over-rev/lug engine, clash gears, coast)	0	
Uses 4-ways if slow	0	Used brakes properly (no hard braking, no riding or pumping brake)	0	
Traffic check	0	Proper steering (both hands on wheel, not over/under steer)	0	
SEARCH	0	Obedyed all traffic signs and signals	0	
DIRECTION	0	Drove without an accident	0	
SPEED	0	Never put vehicle over sidewalks, lane markings, stop lines, etc.	0	
No errors	0	Examiner was never thrown to left, right, or forward	0	
DRIVING DOWN GRADE		Driver was never forced to take evasive action	0	
Clear brakes	0	Wore seat belt	0	
In proper gear	0	Yielded right of way to pedestrians	0	
Steady braking on grade	0	Yielded right of way to other vehicles, as appropriate	0	
Does not ride clutch	0	No errors	0	
Maintain steady speed	0			
Traffic check	0	NOTES		
SEARCH	0	<i>Before operation MRS satisfactory.</i>		
DIRECTION	0	<i>Vehicle control test satisfactory.</i>		
SPEED	0			
No errors	0			

DA FORM 6125-R, AUG 93

EDITION OF MAR 65 IS OBSOLETE.

Figure 6-1. Road Test Score Sheet (Front).

<p>LEFT TURNS</p> <p style="text-align: center;"><u>Approach</u></p> <table style="width:100%; border-collapse: collapse;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td></td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Traffic check.</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Signal on.</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Smooth deceleration. . .</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Did not coast to start of</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>turn.</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Correct lane to begin</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>turn.</td></tr> </table> <p style="text-align: center;"><u>If Vehicle Stops</u></p> <table style="width:100%; border-collapse: collapse;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td></td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Gap to vehicle in front. .</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Not over stop line.</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Came to full stop.</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Wheels straight ahead. . .</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Stop was necessary. . . .</td></tr> </table> <p style="text-align: center;"><u>Turning</u></p> <table style="width:100%; border-collapse: collapse;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td></td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Traffic check.</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Both hands on wheel. . .</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>No gear change.</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Proper speed.</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Turn not too wide/short</td></tr> </table> <p style="text-align: center;"><u>Completes Turn</u></p> <table style="width:100%; 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REVERSE OF DA FORM 6125-R, AUG 93

Figure 6-2. Road Test Score Sheet (Back).

4. SCORING THE ROAD TEST.

a. The scoring form for the road test is DA Form 6125-R, a two-sided single sheet. (A sample of a completed DA Form 6125-R is at Figures 6-1 and 6-2). A reproducible DA Form 6125-R is located at the back of AR 600-55. The main headings in the boxes give the names of the different maneuvers. Each maneuver has a list of driver behaviors to be scored. Beside each behavior is a letter "O" used for marking the driver for the behavior. In cases where a maneuver is done several times on the route, there is a column of O's for each time the maneuver appears on the route.

b. To score a behavior, draw a stroke through the O whenever the driver's performance is unsatisfactory. Make no mark if the driver performs the behavior correctly. For each maneuver, there is a "No Errors" category at the bottom of the list of behaviors. There is a space beside "No Errors" where you can put a check mark if the driver is satisfactory on all behaviors. These check marks will show that you scored the driver even if the driver made no errors.

c. The only other marking that needs to be done on the test is to indicate maneuvers that were not done. A maneuver might not be done because you missed it for some reason or because there was no opportunity for it on the route. To show that a maneuver was not performed, draw a vertical line down through the entire column of O's used for marking that maneuver.

d. To score the maneuver, follow these steps:

- (1) Find the maneuver on the score sheet and be ready to mark it.
- (2) Check the driver and the traffic. When the driver can pay attention, give the directions for the next maneuver.
- (3) Watch the driver perform the maneuver.
- (4) Mark the score sheet.

e. Mark the driver's score sheet immediately after each maneuver. Do not try to remember what the driver did and mark the sheet later on in the route or back at the office.

f. The following paragraphs describe how to mark the score sheet for each type of maneuver:

- (1) Stop/start on a grade. There are two columns of O's to mark: one for the upgrade stop and one for the downgrade stop. The columns are labeled "Up" and "Down." The behaviors are organized in three groups: approach, stop, and resume. Score each group separately as the driver does them. Score the approach as soon as the driver comes to a stop. Then check the stop behaviors and score them before telling the driver to continue. After the driver pulls away, score the rest of the behaviors.
- (2) Expressway. Score the expressway section in three phases: merge on, lane changes, and exit. Mark each phase as the driver completes it. There are two columns of O's for the lane changes. Mark the one labeled "Left" for the lane change to the left. Mark the one labeled "Right" for the lane change to the right.
- (3) Driving upgrade and driving downgrade. Driving up a grade and driving down a grade are scored separately. Observe how the driver handles the grade and score the behaviors listed. It is especially important that the driver uses the proper gear and appropriate signals and speed on grades because these can affect other traffic.

(4) General driving behavior. General behaviors such as gear changing should be marked at the end of the test. Specific actions such as traffic violations can be marked when they happen. There is also space to write notes. Use this space to make notes of things that do not fit into any scoring categories or to record any unusual events during the test. Remember to draw a vertical line through behaviors that are not graded, such as use of clutch when grading on the HEMTT.

(5) Turns. There are eight columns of O's on the left of the box; eight columns of O's on the right (see Figure 6-2). The columns on the left are for left turns. The ones on the right are for right turns. The columns are numbered according to the order in which the turns occur on the route. Column 1 of the left turn columns is for the first left turn on the route, column 2 is for the second turn, and so on. The first few times an examiner uses a route, it is a good idea to write the names of the locations of the turns at the tops of the columns. This will help keep track of the turns until the route is completely memorized.

(a) Mark a turn in four steps: "Approach," "If Vehicle Stops," "Turning," and "Completes Turn." Mark the "If Vehicle Stops" section only if the driver has to make a legal stop before starting the turn, such as at a traffic light, a stop sign, or yield sign. Do not mark this section if the driver stops for some other reason, such as being blocked by other vehicles part way around the turn.

(b) It is important to observe whether the driver is aware of his vehicle position throughout the turn, because it can affect other traffic. If there is more than one left turn lane, the driver should start his turn from the rightmost turn lane.

(6) Railway crossing. This section has three columns for scoring. The ones labeled "1" and "2" are for actual railway crossings on the route. The one labeled "S" is for the simulated crossing. Vehicles hauling hazardous cargo are required by law to stop between 15 and 50 feet from the nearest railroad crossing and take whatever actions are necessary (for example an open window) to look and listen for trains.

(7) Bridge/underpass. There is one space for marking a bridge and one for marking an underpass.

(8) Curves. There are two columns for scoring curves. The one labeled "Left" is for a curve that turns to the left. The column labeled "Right" is for a curve that turns to the right. Drivers should reduce to a safe speed before entering the curve, then maintain that speed during the curve.

(9) Urban/rural straight sections. This section has two columns. Use the one labeled "Urban" for the urban section. Use the one labeled "Rural" for the rural section. In most cases you will mark the driver when he gets to the end of the section. However, if you see the driver make an error while driving along the section, such as driving in the wrong lane, mark the error as soon as you see it. The driver should drive in the right lane if it is clear or in the center lane if the right lane is blocked or has a large volume of merging traffic.

(10) Lane changes. The column labeled "Left" is for a lane change to the left. The column labeled "Right" is for a lane change to the right. The lane changes are part of the urban section (in addition to the expressway section). Mark each lane change as soon as the driver makes it.

(11) Intersections. There are four columns for marking the driver on intersections. Columns 1 and 2 are for intersections where the driver has to make a legal stop; for example, at a traffic light or a stop sign. Columns 3 and 4 are for marking intersections that the driver goes straight through. There are two phases to marking a stop intersection: stopping and driving through. For a stop intersection, driving through items cover the time from when the driver starts off from the stop to when the driver resumes normal traffic speed. For a driving through intersection, you only mark columns 3 and 4. The urban straight section normally has more than enough intersections to score. Start scoring the intersections as soon as the examinee begins driving along the section. Score stop and through intersections in whatever order they come up in. It does not matter if an intersection with traffic lights is sometimes scored as a stop intersection and sometimes scored as a through intersection.

(12) Search, direction, and speed. Most of the grading blocks discussed above have areas for grading search, direction, and speed in addition to the other behaviors listed. These are general categories which the examiner should be monitoring through each exercise.

(a) Search. At all times during the road test the driver must be constantly checking the front, sides, and rear of his vehicle for traffic, pedestrians, obstructions, emergencies, and so forth. During each maneuver, the examiner must observe whether the driver is checking around him and yields right of way to other road users when appropriate.

(b) Direction. The driver must be aware of the position of his vehicle at all times. During each maneuver, the examiner must observe the vehicle position in the lane, whether the vehicle is in the correct lane, and whether the driver maintains the appropriate distance from traffic, stop lines, and so on.

(c) Speed. The driver must be aware not only of his speed in comparison with the speed limit, but how his speed affects other traffic. During each maneuver the examiner must watch to see that the driver maintains posted speed limits, accelerates and decelerates smoothly, uses the proper gear for his speed, and blends in with the traffic flow. The examiner must also observe that the driver does not lug or race the engine, coast the vehicle, change gears or brake on tracks or in the middle of intersections, stall the engine, and so forth.

(13) Driver errors at nonmarking locations. Since the examiner scores at predetermined locations, there will be occasions when the driver makes an error at some place other than one of these locations. Score the error in the General Driving Behavior section of the form if appropriate. Otherwise, ignore the error. If the route has a lot of places where the examiner cannot score the driver, the route is probably inefficient. If the driver makes errors in places where the examiner does not score, the driver will likely make errors in places where scoring can be done. Do not decide where to score a driver based on when the driver makes an error. Stick to scoring at the predetermined locations.

5. COMPUTING THE DRIVER'S SCORE.

a. Road test score sheet. At the end of the test, make sure all driver and examiner information is completed. Check that everything is marked clearly and correctly. Be sure to cross out maneuvers that were not done on the test. Review the scored maneuvers for repeated errors and score errors in the general driving behavior. Carefully add the number of marked letter O's and write the total in the "Score" space on the front of the form. A passing score is 25 errors or less. The driver fails the road test if he makes 26 or more errors (errors accumulated on the vehicle control test DO NOT count toward the score on the driving portion of the road test). If the score is close to a failing score, double-check that you have added correctly.

b. Failures. Annotate reason for failure in the Notes section; for example, "Examinee exhibited undue nervousness." The following are some reasons for failures:

- (1) Any unsafe driving act.
- (2) Failure to properly perform PMCS.
- (3) Not knowing location and function of gauges and controls.
- (4) Unsatisfactory performance on vehicle control test.
- (5) Undue nervousness.
- (6) Failure to achieve minimum passing score.

NOTE: If the individual scores 25 errors or less, but the examiner feels that the individual needs additional training, the examiner has the right not to issue a license.

c. After-action review. Whether the driver passes or fails, the examiner will review the results of the road test with him and bring to his attention any weaknesses that require further practice or training. If the driver failed, tell him what caused him to fail. Advise him that an standard Army OF 346 cannot be issued and he will have to retake the entire performance test at a later date. Whether pass or fail, the results must be recorded on the DA Form 6125-R.

INTERMEDIATE TRAINING OBJECTIVE 3

PERFORMANCE TEST

OFF-ROAD DRIVING

NAME _____ RANK _____ UNIT _____

EVALUATOR _____ DATE _____

STEPS

1. DOES NOT SHIFT THE TRANSMISSION INTO FIRST GEAR, THE TRACTION CONTROL LEVER, OR THE TRANSFER CASE WHILE THE TRUCK IS MOVING.

2. SHIFTS THE TRANSFER INTO LO RANGE WITH THE TRANSMISSION IN THE "N" POSITION.

3. PLACES THE TRACTION CONTROL LEVER IN THE LEFT OR RIGHT POSITION AS NEEDED WITH THE VEHICLE STOPPED.

4. SETS THE TRANSMISSION RANGE SELECTOR TO 2 OR 1 AS NEEDED.

5. ANTICIPATES TERRAIN AND, BEFORE NEGOTIATING, TAKES POSITIVE ACTION TO MATCH DRIVE LINE LOCKUP, ENGINE BRAKE SELECTION, AND GEAR SELECTION TO TERRAIN FEATURES.

6. DOES NOT SHIFT INTO ANY LOWER GEAR THAN IS NECESSARY TO MAINTAIN HEADWAY.

7. CHECKS FOR OBSTRUCTIONS/CLEARANCES AND CHOOSES THE BEST ROUTE OF TRAVEL TO AVOID OBSTACLES.

8. MAINTAINS CONTROL OF THE VEHICLE.

9. MANEUVERS AROUND, NOT OVER OBSTACLES.

10. DRIVES SLOWLY ENOUGH TO PREVENT TRUCK DAMAGE, LOOSE OR SHIFTING CARGO, AND INJURY TO VEHICLE OCCUPANTS.

11. MANUALLY DOWNSHIFTS/UPSHIFTS THE TRANSMISSION PROPERLY WHEN NECESSARY, SUCH AS ON GRADES.

GO	NO-GO

STEPS

12. CHECKS THE OPERATION OF THE JACOBS ENGINE BRAKE SYSTEM ON GRADES.

13. ASCENDS/DESCENDS HILLS IN A STRAIGHT APPROACH.

14. CROSSES RAVINES AND DITCHES PROPERLY.

15. DOES NOT EXCEED THE FORDING DEPTH/SPEED.

GO	NO-GO

CHAPTER 7

LESSON OUTLINES FOR MATERIAL HANDLING CRANE
AND SELF RECOVERY WINCH OPERATIONS

LESSON TITLE: OPERATE AN M977 HEMTT CRANE

TASK NUMBER: 551-721-1407 (Operate a Crane on an M977 HEMTT) and 551-721-1352 (Perform Vehicle Preventive Maintenance Checks and Services [PMCS])

A. TRAINING OBJECTIVE.

TASK: Operate and perform operator PMCS on the M977 HEMTT crane.

CONDITION: Given instruction, a suitable training area, an M977 HEMTT with BII, several palletized loads of differing weights, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, and a requirement to inspect the truck crane components according to the PMCS tables listed in TM 9-2320-279-10-1 and to operate the crane using both manual and remote controls; prepare the crane for use, set up the outriggers, raise the boom to its operating position, rotate and telescope the boom, load/off load palletized cargo, shut down the crane, and stow the outriggers.

STANDARDS: Without causing damage to the HEMTT or injury to personnel, operate the crane in the correct sequence in accordance with TM 9-2320-279-10-1. Correct all faults within the operator's level of maintenance and record all others legibly on DA Form 2404. If no faults are found, make necessary entries on DA Form 2404. Students will be graded on a GO/NO-GO basis. See enclosed training evaluation checklist.

B. INTERMEDIATE TRAINING.

Intermediate Training Objective 1

TASK: Operate the crane on the M977 HEMTT.

CONDITION: Given instruction, a suitable training area, an M977 HEMTT with BII, several palletized loads of differing weights, and a requirement to operate the crane using both manual and remote controls; prepare the crane for use, set up the outriggers, raise the boom to its operating position, rotate and telescope the boom, load and off load the vehicle, shut down the crane, and stow the outriggers.

STANDARDS: Without causing damage to the HEMTT or injury to personnel, operate the crane in the correct sequence in accordance with TM 9-2320-279-10-1. Students will be graded on a GO/NO-GO basis. See enclosed training evaluation checklist.

Intermediate Training Objective 2

TASK: Perform operator PMCS on the M977 HEMTT crane.

CONDITION: Given instruction, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, an M977 HEMTT with BII, and a requirement to inspect the truck crane components according to the PMCS tables listed in TM 9-2320-279-10-1.

STANDARDS: Correct all faults within the operator's level of maintenance and record all others legibly on DA Form 2404. If no faults are found, make necessary entries on DA Form 2404.

C. ADMINISTRATIVE INSTRUCTIONS.

1. Training time: As scheduled.
2. Training location: Classroom and training area as scheduled.
3. Training type: Conference, demonstration, and practical exercise.
4. Students: Scheduled personnel.

5. Principal and assistant instructors required: One primary instructor for the conference and one assistant instructor for each two students for the demonstration and practical exercise.

6. Training aids and equipment: Television, VCR, overhead projector, transparencies (see Appendix A), and TVT 55-25. Hearing protection and work gloves are required for all personnel. DA Form 2404, pencil, rags, TM 9-2320-279-10-1, equipment records folder, an M977 HEMTT with BII, and several palletized loads of differing weights for every two students.

7. References: AR 385-55, DA Pamphlet 738-750, and TM 9-2320-279-10-1.

D. SEQUENCE OF ACTIVITY.

1. Introduction:
 - a. Interest device.
 - b. Tie-in.
 - c. Lesson objective (paragraph A).
 - d. Procedures:
 - (1) Explanation and demonstration.
 - (2) Practical exercise.
 - (3) Summary.
2. Explanation and demonstration:

NOTE: The classroom must be near the training area where crane operations are to be practiced. This allows the student to view the videotape and put into practical application these operational procedures with a minimum loss of learned skills. Explain safety precautions and warnings, followed by the videotape, and then demonstrate loading, off loading, and PMCS. PMCS on the crane is performed after operation.

- a. Explain all safety precautions for this exercise and review warnings. Attention should be drawn to all warnings in the vehicle operator's manual with particular attention given the following:

Transparency HEMTT 4-1

WARNING

Do not operate the crane unless both outriggers are set up. Vehicle could turn over causing serious injury or death.

WARNING

Keep hands and body away from the outrigger beams while operating the outrigger extension lever or injury could result when the beams come out.

WARNING

Be careful when removing the outrigger pads from their stowed position. Sharp edges can injure the hands.

WARNING

When lowering the outrigger jack cylinders, keep hands and feet clear of the cylinders to avoid injury.

WARNING

Do not raise the vehicle tires off the ground with the outrigger jack cylinders. The vehicle could roll causing serious injury or death.

WARNING

The crane must be level from side to side. Use of the crane in an unlevel position can cause the vehicle to tip over causing possible serious injury or death.

WARNING

Operate the crane from the forward or rear remote control station if the operator will not be able to see the load at all times during crane operation. Failure to control the boom while it is moving could cause serious injury or death.

Transparency HEMTT 4-2

WARNING

Keep the boom clear of all electrical lines and other obstacles while operating the crane. Serious injury or death could result upon contact.

WARNING

Be sure that the area is clear of personnel before moving the swing control lever. The boom should be swung slowly enough so the crane operator has complete control. If the operator cannot see the load during operation, operate the crane from the remote control unit. Failure to control the boom while it is moving could cause serious injury or death.

WARNING

The operator must keep control of the load at all times. If necessary, attach cargo tiedowns to the load for use as a control tether. Failure to control the load while it is moving could cause serious injury or death.

WARNING

Make sure the remote control on/off/MHC-shutdown power switch is in the off position before connecting the remote control unit. A crane moving out of control could cause serious injury or death.

WARNING

Be sure there are at least two wraps of cable on the hoist drum at all times. Serious injury or death could result if the cable comes off the hoist drum while lifting a load.

Transparency HEMTT 4-3

WARNING

The operator should use the remote control unit in a position that the load will not pass overhead. The load could fall causing serious injury or death.

WARNING

If the electrical power fails during crane operation, move the switch on the remote control unit to the shutdown position. Serious injury could result from uncontrolled moving parts.

- b. Show TVT 55-25.
- c. Demonstrate loading/off loading the load from the truck using the HEMTT crane with both manual and remote controls and crane PMCS. Diagram of area for crane operation is at Figure 5-8.

3. Practical exercise:

- a. Assign students to vehicles and crane operation area. Issue work gloves, TM 9-2320-279-10-1, pencils, DA Form 2404, and equipment records folder. Tell students where rags are located.
- b. Students practice operating the crane to load/off load palletized cargo to and from the HEMTT. PMCS of the crane is also performed at this time.

NOTE: Do not allow the students to perform any unsafe acts. Crane operations must be closely supervised because of the potential for injury or death.

4. Evaluate: Check each student's performance of crane operations to include PMCS.

5. Summary:

- a. Recap main points.
- b. Allow for questions.
- c. Clarify questions.
- d. Closing statement.

6. Retraining: Retrain NO-GOs and slow learners. All students must receive a GO in all areas of the attached training evaluation checklist.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when vehicles are parked or maintenance is to be performed.
2. Ensure the transmission is in N, the parking brake is set, and the engine is shut off before leaving the vehicle, when the vehicle is parked, or maintenance is being performed.
3. Ensure all personnel remove all wristwatches, rings, bracelets, neck chains, and any other jewelry before working in or around the HEMTT.
4. Ensure all personnel pay particular attention to the cautions and warnings listed in the operator's manuals.
5. Ensure the driver and ground guides know and understand the hand and arm signals, especially the signal to stop, as outlined in FM 21-305.
6. Ensure ground guide(s) are used when backing.
7. Ensure all backing is conducted at a speed of 5 MPH or less.
8. Do not park the vehicle on a steep grade. Serious injury or death can result.
9. Ensure all personnel wear hearing protection when working in or around a running HEMTT.
10. Ensure all occupants wear seat belts while the vehicle is in operation.
11. Ensure personnel maintain at least three points of contact when mounting or dismounting the vehicle (to include performing PMCS).
12. The vehicle access ladder must be used when performing maintenance. The two hooks on the ladder must be installed in the front skid plate holes, right front fender holes, or left front fender holes as required. When installing the access ladder on the right front fender, do not hit the fuel-water separator. Hitting the fuel-water separator could cause the glass to break.
13. Ensure all personnel are clear of the vehicle before engine start is attempted. Operator must visually check to see that all areas of the truck are clear of personnel before attempting to start the engine. Failure to do so could result in serious injury or death to personnel.
14. Always place the transmission in N and set the parking brake before operating the crane.
15. Always wear heavy work gloves when handling cable. Never let the cable run through your hands. A frayed cable may cut you severely.
16. Position the vehicle on level ground if possible. If the ground is not level, the outriggers can be used to level the vehicle from side to side on up to a 5 degree side slope.
17. Be careful when handling the outrigger pads. Sharp edges can injure hands.
18. Keep hands and body away from outrigger beams while operating the outrigger extension lever or injury could result when the beams come out.
19. When lowering the outrigger jack cylinders, keep hands and feet clear of the cylinders to avoid injury.

TC 21-305-1

20. Outrigger cylinders must be extended to remove enough weight from the suspension so that the tires do not bulge, or the vehicle could roll over, causing serious injury or death.

21. Do not operate the crane unless both outriggers are set up. The vehicle could turn over causing serious injury or death.

22. Do not raise the vehicle tires off the ground with the outrigger jack cylinders. The vehicle could roll causing serious injury or death.

23. Keep the boom clear of all electrical lines and other obstacles while operating the crane. Serious injury or death could result upon contact.

24. The operator should be stationed to be able to see the load at all times during crane operation. Operate the crane from the forward or rear remote control station if the load is not visible from the main crane control panel. Failure to control the boom and load while moving could cause serious injury or death.

25. The operator must keep control of the load at all times. If necessary, attach cargo tiedowns to the load for use as a control tether. Failure to control the load could cause serious injury or death.

26. Be sure that the area is clear of personnel before moving the swing control lever. The boom should be swung slowly enough so the crane operator has complete control. If the operator cannot see the load during operation, operate the crane from the remote control unit. Failure to control the boom while it is moving could cause serious injury or death.

27. Be sure there are at least two wraps of cable on the hoist drum at all times. Serious injury or death could result if the cable comes off the hoist drum while lifting a load.

28. Make sure the remote control on/off/MHC-shutdown power switch is in the off position before connecting the remote control unit. The crane moving out of control could cause serious injury or death.

29. If electrical power fails during crane operation, move the switch on the remote control unit to the shutdown position. Serious injury could result from uncontrolled moving parts.

30. The crane must be level from side to side. Use of the crane in an unlevel position can cause the vehicle to tip over causing serious injury or death.

31. The operator should use the remote control unit in a position that the load will not pass overhead. The load could fall causing serious injury or death.

32. When operating two control levers at the same time, if one function is held wide open and "dead-headed" (such as cylinder is fully extended) and another function is operated, the second function can operate at a greater than normal speed, which can cause loss of control and serious injury or death to personnel.

F. **ADDITIONAL COMMENTS AND INFORMATION.** Recommended instructional time is 4 hours (.5 conference, .5 demonstration, and 3 hours practical exercise [PMCS is integrated]).

<u>STEPS</u>		GO	NO-GO
13.	CLEANS ALL FOREIGN MATERIAL FROM SOCKET IN OUTRIGGER PAD AND FROM ROD END OF OUTRIGGER JACK CYLINDER.		
14.	POSITIONS OUTRIGGER PAD DIRECTLY BELOW OUTRIGGER JACK CYLINDER.		
15.	REPEATS STEPS 11 THROUGH 14 TO SET UP THE OUTRIGGER PAD ON THE OTHER SIDE.		
16.	MOVES LEFT OUTRIGGER JACK CONTROL LEVER TO DOWN POSITION AND LOWERS OUTRIGGER JACK CYLINDER UNTIL ROD END IS SEATED IN OUTRIGGER PAD.		
17.	INSTALLS RETAINING PINS IN OUTRIGGER PAD.		
18.	MOVES RIGHT OUTRIGGER JACK CONTROL LEVER TO DOWN POSITION AND LOWERS OUTRIGGER JACK CYLINDER UNTIL ROD END IS SEATED IN OUTRIGGER PAD.		
19.	INSTALLS RETAINING PINS IN OUTRIGGER PAD.		
20.	MOVES LEFT AND RIGHT OUTRIGGER JACK CONTROL LEVERS TO DOWN POSITION. LOWERS LEFT AND RIGHT OUTRIGGER JACK CYLINDERS UNTIL VEHICLE WEIGHT IS OFF SUSPENSION. EXTENDS JACKS INDIVIDUALLY AS NECESSARY TO LEVEL THE TRUCK SIDE TO SIDE.		
RAISE AND OPERATE CRANE:			
21.	MOVES HOIST CONTROL LEVER TO DOWN POSITION AND LOWERS HOIST CABLE APPROXIMATELY 12 INCHES.		
22.	DISCONNECTS LOAD HOOK FROM STOWAGE RING BRACKET.		
23.	OPERATES BOOM CONTROL LEVER IN UP POSITION UNTIL BOOM IS IN VERTICAL POSITION.		
24.	OPERATES MAST CONTROL LEVER IN UP POSITION UNTIL MAST CYLINDERS ARE FULLY RAISED AND BOOM IS IN A HORIZONTAL POSITION.		
OPERATE CRANE WITH REMOTE CONTROL UNIT:			
25.	TURNS ON/OFF POWER SWITCH ON ELECTRIC CONTROL BOX TO OFF POSITION.		

STEPS

STOW OUTRIGGERS:

- 56. MOVES LEFT AND RIGHT OUTRIGGER JACK CONTROL LEVERS TO UP POSITION TO RETRACT OUTRIGGER JACK CYLINDERS COMPLETELY.

- 57. INSTALLS TWO RETAINING PINS IN EACH OUTRIGGER PAD.

- 58. STOWS OUTRIGGER PADS ON OUTRIGGER BEAM STUDS.

- 59. INSTALLS SAFETY PINS THROUGH STUDS.

- 60. MOVES OUTRIGGER EXTENSION CONTROL LEVER TO IN POSITION TO RETRACT OUTRIGGER BEAMS COMPLETELY.

- 61. TURNS ENGINE HIGH IDLE ON/OFF SWITCH TO OFF POSITION.

- 62. TURNS ON/OFF POWER SWITCH TO OFF POSITION.

- 63. PUTS PTO ENGAGE SWITCH IN OFF POSITION.

- 64. SHUTS OFF ENGINE AND SECURES LOAD.

GO	NO-GO

TC 21-305-1

LESSON TITLE: PERFORM SELF RECOVERY ON AN M977/M978 HEMTT USING THE WINCH

TASK NUMBER: 551-721-1390 (Perform Self Recovery on a HEMTT Using a Winch) and 551-721-1352 (Perform Vehicle Preventive Maintenance Checks and Services [PMCS])

A. TRAINING OBJECTIVE.

TASK: Perform self recovery on an M977/M978 HEMTT using the winch and operator PMCS on the winch.

CONDITION: Given instruction, suitable training area, suitable anchor, an M977/M978 HEMTT with operational winch and BII, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, and a requirement to inspect the truck winch according to the PMCS tables listed in TM 9-2320-279-10-1 and recover the vehicle.

STANDARDS: Recover the vehicle in the correct sequence so that it is free to move under its own power without causing damage to the vehicle or injury to personnel. Correct all faults within the operator's level of maintenance and record all others legibly on DA Form 2404. If no faults are found, make necessary entries on DA Form 2404. You must perform this task as both the driver and assistant driver. Students will be graded on a GO/NO-GO basis. See enclosed training evaluation checklist.

B. INTERMEDIATE TRAINING.

Intermediate Training Objective 1

TASK: Perform self recovery on an M977/M978 HEMTT using the winch.

CONDITION: Given instruction, suitable training area, suitable anchor, an M977/M978 HEMTT with operational winch and BII, and a requirement to recover the vehicle.

STANDARDS: Recover the vehicle in the correct sequence so that it is free to move under its own power without causing damage to the vehicle or injury to personnel. You must perform this task as both the driver and assistant driver. Students will be graded on a GO/NO-GO basis. See enclosed training evaluation checklist.

Intermediate Training Objective 2

TASK: Perform operator PMCS on the M977/M978 HEMTT winch.

CONDITION: Given instruction, DA Form 2404, pencil, TM 9-2320-279-10-1, equipment records folder, rags, an M977/M978 HEMTT with BII, and a requirement to inspect the vehicle winch according to the PMCS tables listed in TM 9-2320-279-10-1.

STANDARDS: Correct all faults within the operator's level of maintenance and record all others legibly on DA Form 2404. If no faults are found, make necessary entries on DA Form 2404.

C. ADMINISTRATIVE INSTRUCTIONS.

1. Training time: As scheduled.
2. Training location: Classroom and training area as scheduled.
3. Training type: Conference, demonstration, and practical exercise.
4. Students: Scheduled personnel.

5. Principal and assistant instructors required: One primary instructor for the conference, one assistant instructor for each six students for the demonstration, and one assistant instructor for each two students for the practical exercise.

6. Training aids and equipment: Television, VCR, and TVT 55-24. Hearing protection and work gloves are required for all personnel. DA Form 2404, pencil, rags, TM 9-2320-279-10-1, equipment records folder, a winch equipped HEMTT with BII, and anchor for every two students.

7. References: AR 385-55, DA Pamphlet 738-750, TM 9-2320-279-10-1, and FM 20-22.

D. SEQUENCE OF ACTIVITY.

1. Introduction:
 - a. Interest device.
 - b. Tie-in.
 - c. Lesson objective (paragraph A).
 - d. Procedures:
 - (1) Explanation.
 - (2) Practical exercise.
 - (3) Summary.

2. Explanation and demonstration:

NOTE: The classroom must be near the training area where recovery operations are to be practiced. This allows the student to view the videotape and put into practical application these self recovery procedures with a minimum loss of learned skills. Explain safety precautions and warnings, followed by the videotape, and then demonstrate PMCS of the winch and self recovery. PMCS on the winch is performed in conjunction with weekly winch operation.

- a. Explain all safety precautions for this exercise and review warnings. Attention should be drawn to all warnings in vehicle operator's manual with particular attention given the following:

Transparency HEMTT 5-1

WARNING

Always wear heavy gloves when handling the winch cable. Never let the moving cable slide through the hands, even when wearing gloves. A broken cable could cut through the glove and cut the hand severely.

WARNING

Never operate the winch with less than five wraps of cable on the winch drum. Serious injury or death could result if the cable comes off the drum while winching.

WARNING

Avoid quick, jerking winch operation. Keep other personnel well away from the vehicle involved in the winching operation. A snapped cable or shifting load can cause serious injury or death.

WARNING

Do not operate the winch while personnel are working on or around the tensioning device. Severe injury to arms, hands, and fingers may result if the cable moves while working with the cable and tensioning device.

WARNING

Keep all personnel clear of the area near the cable when tension is on the cable (at least one cable length away from and opposite the angle of pull). If the cable breaks, it can cause severe injury or death.

Transparency HEMTT 5-2

WARNING

Do not use the winch to reel the clevis end of the cable through the roller guides. The clevis may catch on the roller guide and cause the cable or roller guide to break. Broken cables or roller guides can cause serious injury or death.

WARNING

Keep all personnel clear of the winch area when the winch is reeling in the cable. If hands are caught in the winch or the cable, or if the cable breaks under tension, severe injury or death could occur.

WARNING

Do not reel in the cable too tightly. If too much tension is applied, the cable or tiedown ring can break causing severe injury to personnel.

- b. Show TVT 55-24.
- c. Demonstrate hand and arm signals required for this exercise.
- d. Demonstrate self recovery of a HEMTT to include winch PMCS.

NOTE: The HEMTT will be winched forward for this exercise. The students will also winch the vehicle forward. Winching the HEMTT rearward is similar.

3. Practical exercise:

- a. Assign students to vehicles and recovery location. Diagram of area for self recovery is at Figure 5-9. Issue work gloves to each student.
- b. Students practice self recovery of the HEMTT and winch PMCS. Ensure the students practice as both the driver and the assistant driver.

NOTE: Do not allow the students to perform any unsafe acts. Recovery operations must be closely supervised because of the potential for injury or death.

4. Evaluate: Check each student's performance of self recovery and winch PMCS as both the driver and assistant driver.

5. Summary:

- a. Recap main points.
- b. Allow for questions.
- c. Clarify questions.
- d. Closing statement.

6. Retraining: Retrain NO-GOs and slow learners. All students must receive a GO in all areas of the attached training evaluation checklist.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when vehicles are parked or maintenance is to be performed.

2. Ensure the transmission is in N, the parking brake is set, and the engine is shut off before leaving the vehicle, when the vehicle is parked, or maintenance is being performed.

3. Ensure all personnel remove all wristwatches, rings, bracelets, neck chains, and any other jewelry before working in or around the HEMTT.

4. Ensure all personnel pay particular attention to the cautions and warnings listed in the operator's manuals.

5. Ensure the driver and ground guides know and understand the hand and arm signals, especially the signal to stop, as outlined in FM 21-305.

6. Ensure ground guide(s) are used when backing.

7. Ensure all backing is conducted at a speed of 5 MPH or less.

8. Do not park the vehicle on a steep grade. Serious injury or death can result or the vent on the M978 tanker may leak.

9. Ensure all personnel wear hearing protection when working in or around a running HEMTT.

10. Ensure all occupants wear seat belts while the vehicle is in operation.

11. Ensure personnel maintain at least three points of contact when mounting or dismounting the vehicle (to include performing PMCS).

12. The vehicle access ladder must be used when performing maintenance. The two hooks on the ladder must be installed in the front skid plate holes, right front fender holes, or left front fender holes as required. When installing the access ladder on the right front fender, do not hit the fuel-water separator. Hitting the fuel-water separator could cause the glass to break.

13. Ensure all personnel are clear of vehicle before engine start is attempted. Operator must visually check to see that all areas of the vehicle are clear of personnel before attempting to start the engine. Failure to do so could result in serious injury or death to personnel.

14. Always wear heavy leather palmed work gloves when handling the winch cable. Never let the moving cable slide through the hands, even when wearing gloves. Winch cable can become frayed or contain broken wires. Frayed or broken wires can cut through gloves and cut hands.

15. Never walk between the vehicle and anchor.

16. The driver must have a clear view of the assistant driver at all times.

17. Do not bend the winch cable at sharp angles.

18. Do not operate the winch while personnel are working on or around the cable guides or tensioning device. Severe injury to arms, hands, and fingers may result if the cable moves while working with the cable and the cable guides or tensioning device.

19. Keep all personnel clear of the winch area when the winch is reeling in the cable. If hands are caught in the winch or the cable, or if the cable breaks under tension, severe injury or death could occur.

20. Keep all personnel clear of the area near the cable when tension is on the cable (at least one cable length away from and opposite the angle of pull). If the cable breaks, it can cause severe injury or death.

21. Avoid quick, jerking winch operation. Keep other personnel well away from the vehicle involved in the winching operation. A snapped cable or shifting load can cause serious injury or death.

22. Do not use the winch to reel the clevis end of the winch cable through the roller guides. The clevis may catch on the roller guides and cause the cable or roller guides to break. Broken cables or roller guides can cause serious injury or death.

23. Do not reel in the winch cable too tightly. If too much tension is applied, the cable or tiedown ring can break causing severe injury to personnel.

24. Never operate the winch with less than five wraps of cable on the winch drum. If a load is applied with less than five wraps of cable on the winch, the cable may come loose on the drum.

25. When attaching the self recovery winch cable to another vehicle, that vehicle must be used only as an anchor point or damage to equipment may result.

26. The self recovery winch is not designed to winch the mired vehicle by itself. Vehicle drive system power must always be used with the winch to self recover the vehicle, or damage to equipment can result.

27. If the winch does not move the vehicle, stop using the winch. Overheating damage may occur.

28. Keep the winch cable tight at all times so the cable does not get tangled with the vehicle.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 4 hours (.5 conference, .5 demonstration, and 3 hours practical exercise [PMCS is integrated]).

TRAINING EVALUATION

PERFORM SELF RECOVERY ON A HEMTT, USING THE VEHICLE MOUNTED WINCH (FORWARD)

NAME _____ RANK _____ UNIT _____

EVALUATOR _____ DATE _____

AS DRIVER

AS ASSISTANT DRIVER

STEPS	STEPS	GO	NO-GO
1. SHUTS OFF ENGINE.	NA		
2. ADJUSTS PASSENGER MIRROR SO DRIVER CAN SEE PASSENGER AT REAR OF VEHICLE.	ADJUSTS PASSENGER MIRROR SO DRIVER CAN SEE PASSENGER AT REAR OF VEHICLE.		
3. ENSURES PTO ENGAGE SWITCH IS IN THE OFF POSITION.	NA		
4. NA	PULLS THE SELECTOR VALVE CONTROL OUT.		
5. STARTS ENGINE.	NA		
6. CHECKS THAT TRANSMISSION RANGE SELECTOR IS SET TO N.	NA		
7. SETS PTO ENGAGE SWITCH TO ON.	NA		
8. MOVES WINCH SHIFT LEVER TO OUT POSITION TO PAY OUT SMALL AMOUNT OF CABLE.	NA		
9. SETS THE WINCH SHIFT LEVER TO THE CENTER POSITION.	NA		
10. SETS THE PTO ENGAGE SWITCH TO OFF.	NA		

AS DRIVER	AS ASSISTANT DRIVER	GO	NO-GO
STEPS	STEPS		
11. NA	REMOVES THE COTTER PIN FROM THE CLEVIS PIN.		
12. NA	REMOVES THE PIN FROM THE CLEVIS AND DISCONNECTS THE CLEVIS FROM THE TIEDOWN RING.		
13. NA	REINSTALLS THE PIN IN THE CLEVIS WITH THE COTTER PIN.		
14. NA	PULLS THE WINCH CABLE UNDER THE WINCH AND UP ALONG THE FRONT FACE OF THE WINCH TOWARDS THE FRONT OF THE VEHICLE.		
15. SETS THE PTO ENGAGE SWITCH TO ON.	NA		
16. MOVES THE WINCH SHIFT LEVER TO OUT AND LETS OUT SOME CABLE.	ROUTES THE CABLE THROUGH THE NOTCH IN THE FENDER AND CONTINUES TO ROUTE CABLE ABOVE TENSIONING DEVICE PULLEYS.		
17. CONTINUES TO LET OUT THE WINCH CABLE.	AT CABLE GUIDE, MOVES SHEAVE TOWARDS VEHICLE FRAME AND HOLDS IN POSITION. ROUTES WINCH CABLE THROUGH CABLE GUIDE. CABLE MUST BE BETWEEN TWO ROLLERS. ALLOWS SHEAVE TO MOVE BACK TOWARDS WINCH CABLE. LIFTS UP ON WINCH CABLE AND PLACES IN GROOVE OF SHEAVE.		
18. CONTINUES TO LET OUT MORE WINCH CABLE.	ROUTES THE CABLE OVER THE FIRST AXLE AND ONE FOOT PAST THE FRONT ROLLER GUIDE ASSEMBLY.		

AS DRIVER	AS ASSISTANT DRIVER	GO	NO-GO
STEPS	STEPS		
19. SETS THE WINCH SHIFT LEVER TO THE CENTER POSITION.	NA		
20. SETS THE PTO ENGAGE SWITCH TO OFF.	NA		
21. NA	REMOVES THE QUICK RELEASE PIN AND BRACKET. MOVES CABLE GUIDE BRACKETS APART.		
22. NA	PLACES THE WINCH CABLE AGAINST BOTTOM OF SHEAVE. ROUTES WINCH CABLE UNDER SHEAVE. MOVES CABLE GUIDE BRACKETS TOGETHER.		
23. NA	REINSTALLS THE GUIDE BRACKET AND QUICK RELEASE PIN.		
24. SETS THE PTO ENGAGE SWITCH TO ON.	NA		
25. MOVES THE WINCH SHIFT LEVER TO OUT AND LETS OUT THE WINCH CABLE.	PULLS THE CABLE TO A TREE, ANOTHER HEAVY VEHICLE, OR SOME OTHER STATIONARY HEAVY OBJECT.		
26. WHEN THE WINCH CABLE IS LET OUT TO THE HEAVY OBJECT, SETS THE WINCH SHIFT LEVER TO THE CENTER POSITION.	NA		
27. SETS THE PTO ENGAGE SWITCH TO OFF.	NA		
28. NA	ATTACHES THE CABLE TO ANCHOR POINT (SUCH AS A TREE).		

AS DRIVER	AS ASSISTANT DRIVER	GO	NO-GO
STEPS	STEPS		
29. NA	CHECKS WINCH CABLE FOR BROKEN WIRES AND KINKS.		
30. ENSURES THE WINCH SHIFT LEVER IS SET AT THE CENTER POSITION AND THE PTO ENGAGE SWITCH IS SET TO OFF.	CHECKS TO SEE THAT THERE ARE AT LEAST FIVE WRAPS OF WINCH CABLE LEFT ON THE DRUM.		
31. NA	PULLS BACK AND HOLDS THE TENSION PULLEY LEVER ON CABLE GUIDE. PUTS THE WINCH CABLE BETWEEN TENSIONING DEVICE PULLEYS. RELEASES THE TENSION PULLEY LEVER.		
32. NA	CHECKS THAT THE WINCH CABLE RESTS INSIDE GROOVES OF TENSIONING DEVICE PULLEYS AND SHEAVE.		
33. NA	CHECKS THAT WINCH CABLE IS NOT CAUGHT ON THE VEHICLE OR ANY OTHER OBJECTS.		
34. ENSURES THAT ALL PERSONNEL ARE CLEAR OF THE WINCH AND THE WINCH CABLE.	TAKES COVER IN A PROTECTED AREA AWAY FROM THE WINCH AND THE WINCH CABLE.		
35. SETS THE PTO ENGAGE SWITCH TO ON.	NA		
36. MOVES THE WINCH SHIFT LEVER TO IN UNTIL THE SLACK IS OUT OF THE CABLE.	NA		
37. MOVES THE WINCH SHIFT LEVER TO THE CENTER POSITION.	NA		

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AS DRIVER	AS ASSISTANT DRIVER	GO	NO-GO
STEPS	STEPS		
38. ENSURES THE TRANSFER CASE SHIFT LEVER IS SET TO THE LO POSITION.	NA		
39. CHECKS THAT THE TRACTION CONTROL LEVER IS SET TO INTER-AXLE DIFF. LOCK.	NA		
40. PRESSES SERVICE BRAKE PEDAL.	NA		
41. SETS THE TRANSMISSION RANGE SELECTOR TO 1.	NA		
42. RELEASES THE PARKING BRAKE.	NA		
43. RELEASES THE SERVICE BRAKE PEDAL.	NA		
44. MOVES THE WINCH SHIFT LEVER TO IN AND APPLIES SLIGHT PRESSURE TO THE ACCELERATOR PEDAL.	NA		
45. ADJUSTS THE POSITION OF THE ACCELERATOR PEDAL TO CHANGE THE ENGINE SPEED AS NEEDED TO KEEP THE WINCH CABLE TIGHT AND THE VEHICLE MOVING.	NA		
46. WHEN THE VEHICLE IS ON SOLID GROUND, SETS THE WINCH SHIFT LEVER TO THE CENTER POSITION, SETS THE PARKING BRAKE, AND SHIFTS THE TRANSMISSION RANGE SELECTOR TO N.	NA		

AS DRIVER	AS ASSISTANT DRIVER	GO	NO-GO
STEPS	STEPS		
47. AFTER RECOVERY, SETS THE WINCH SHIFT LEVER TO OUT AND LETS OUT ENOUGH WINCH CABLE UNTIL ALL TENSION IS OFF THE CABLE.	NA		
48. SETS THE WINCH SHIFT LEVER TO THE CENTER POSITION.	NA		
49. SETS THE PTO ENGAGE SWITCH TO OFF.	NA		
50. NA	ENSURES THERE IS ENOUGH SLACK IN WINCH CABLE AND DISCONNECTS WINCH CABLE FROM ANCHOR POINT (SUCH AS A TREE).		
51. SETS THE PTO ENGAGE SWITCH TO ON.	NA		
52. SETS THE WINCH SHIFT LEVER TO IN.	NA		
53. REELS IN WINCH CABLE.	USES A TIRE IRON HANDLE TO GUIDE THE WINCH CABLE ONTO THE WINCH SO THE CABLE WRAPS ARE LEVEL ACROSS THE FACE OF THE WINCH DRUM.		
54. WHEN THE END OF THE CABLE IS NEAR THE FRONT OF THE VEHICLE, MOVES THE WINCH SHIFT LEVER TO THE CENTER POSITION.	NA		
55. SETS THE PTO ENGAGE SWITCH TO OFF.	NA		

AS DRIVER	AS ASSISTANT DRIVER	GO	NO-GO
STEPS	STEPS		
56. NA	REMOVES THE QUICK RELEASE PIN AND GUIDE BRACKET. MOVES THE CABLE GUIDE BRACKETS APART SO WINCH CABLE CAN BE REMOVED. BY HAND, REMOVES THE WINCH CABLE FROM THE SHEAVE.		
57. NA	MOVES THE CABLE GUIDE BRACKETS BACK TOGETHER. INSTALLS THE GUIDE BRACKET AND THE QUICK RELEASE PIN.		
58. SETS THE PTO ENGAGE SWITCH TO ON AND THE WINCH SHIFT LEVER TO IN.	NA		
59. SLOWLY REELS IN THE WINCH CABLE UNTIL THE END OF WINCH CABLE IS APPROXIMATELY 1 FOOT FROM THE TENSIONING DEVICE.	USES A TIRE IRON HANDLE TO GUIDE THE WINCH CABLE ONTO THE WINCH SO THE CABLE WRAPS ARE LEVEL ACROSS THE FACE OF THE WINCH DRUM.		
60. MOVES THE WINCH SHIFT LEVER TO THE CENTER POSITION AND THE PTO ENGAGE SWITCH TO OFF.	NA		
61. NA	PULLS BACK AND HOLDS THE TENSION PULLEY LEVER.		
62. NA	LIFTS THE WINCH CABLE OUT OF THE GROOVES OF THE TENSIONING DEVICE PULLEYS AND OFF OF THE SHEAVE.		
63. NA	RELEASES THE TENSION PULLEY LEVER.		

AS DRIVER	AS ASSISTANT DRIVER	GO	NO-GO
STEPS	STEPS		
64. NA	PHYSICALLY (BY HAND) PULLS THE WINCH CABLE BACK AND OUT OF THE CABLE GUIDE.		
65. SETS THE PTO ENGAGE SWITCH TO ON AND THE WINCH SHIFT LEVER TO IN.	NA		
66. REELS IN THE WINCH CABLE SLOWLY UNTIL THE CLEVIS IS APPROXIMATELY 2 FEET FROM THE WINCH. MOVES THE WINCH SHIFT LEVER TO THE CENTER POSITION AND THE PTO ENGAGE SWITCH TO OFF.	GUIDES THE WINCH CABLE ONTO THE WINCH; BEING CAREFUL THAT THE END OF THE CABLE DOES NOT GET CAUGHT ON THE NOTCH IN THE FENDER.		
67. NA	ROUTES THE END OF THE WINCH CABLE DOWN ALONG THE FRONT FACE OF THE WINCH, UNDER THE WINCH, AND OUT THROUGH THE HOLE IN THE BOTTOM OF THE REAR WINCH FRAME.		
68. NA	CONNECTS THE CLEVIS TO THE TIEDOWN RING WITH THE PIN AND THE COTTER PIN.		
69. SETS THE PTO ENGAGE SWITCH TO ON.	NA		
70. HAS EVERYONE STAND CLEAR OF THE AREA NEAR THE WINCH, SETS THE WINCH SHIFT LEVER TO IN, AND TAKES ALL THE SLACK OUT OF THE CABLE.	STANDS CLEAR OF THE IMMEDIATE AREA NEAR THE WINCH. WHEN THE CABLE IS TIGHT, SIGNALS THE DRIVER TO STOP.		

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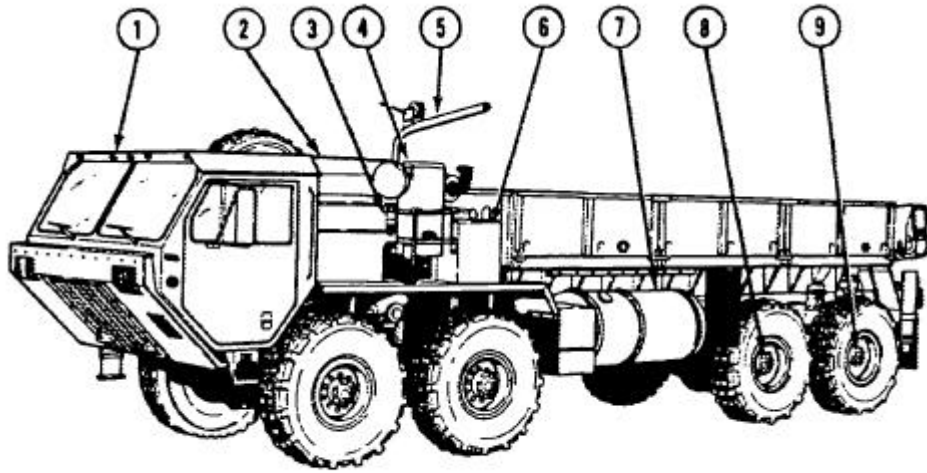
AS DRIVER	AS ASSISTANT DRIVER		
STEPS	STEPS	GO	NO-GO
71. MOVES THE WINCH SHIFT LEVER TO THE CENTER POSITION, SETS THE PTO ENGAGE SWITCH TO OFF, AND SHUTS THE ENGINE OFF.	NA		
72. NA	PUSHES IN THE SELECTOR VALVE CONTROL.		
73. NA	STOWS ALL BII USED DURING WINCHING.		
74. ADJUSTS MIRROR FOR DRIVING.	ADJUSTS MIRROR FOR DRIVING.		

APPENDIX A
PAPER TRANSPARENCIES

THESE PAPER TRANSPARENCIES ARE TO BE REPLICATED AS PLASTIC TRANSPARENCIES FOR USE WITH AN OVERHEAD PROJECTION SYSTEM.

EACH TRANSPARENCY IS NUMBERED AT THE TOP. THAT NUMBER IS IDENTIFIED IN THE BODY OF THE LESSON OUTLINE. FOR EXAMPLE, HEMTT 1-1 THROUGH HEMTT 1-10 ARE REQUIRED FOR THE FIRST LESSON OUTLINE.

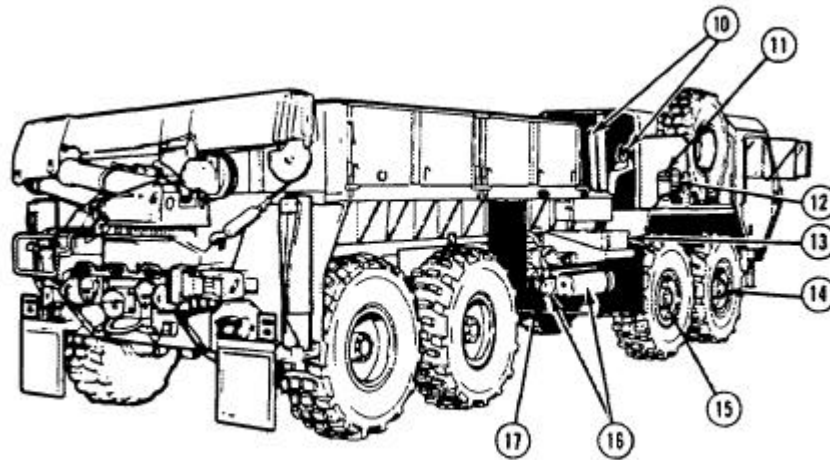
HEMTT 1-1
MAJOR COMPONENTS



LEFT FRONT VIEW

- | | |
|-----------------------|------------------------|
| 1. PERSONNEL CAB | 6. HYDRAULIC RESERVOIR |
| 2. ENGINE COMPARTMENT | 7. FUEL TANK |
| 3. ETHER CANISTER | 8. NO. 3 DRIVING AXLE |
| 4. AIR CLEANER | 9. NO. 4 DRIVING AXLE |
| 5. TIRE DAVIT | |

HEMTT 1-2 **MAJOR COMPONENTS**

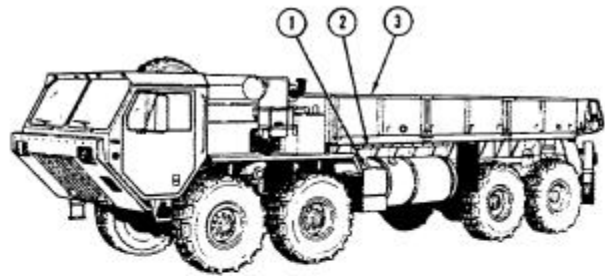


RIGHT REAR VIEW

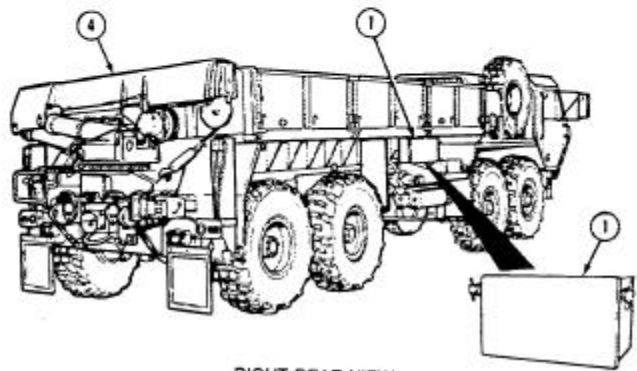
- | | |
|--------------------------|--|
| 10. TIRE DAVIT (STOWED) | 14. NO. 1 DRIVING AXLE |
| 11. AIR DRYER | 15. NO. 2 DRIVING AXLE |
| 12. FUEL-WATER SEPARATOR | 16. AIR RESERVOIRS |
| 13. BATTERY BOX | 17. SELF-RECOVERY WINCH (20% OF FLEET) |

HEMTT 1-3

MAJOR COMPONENTS



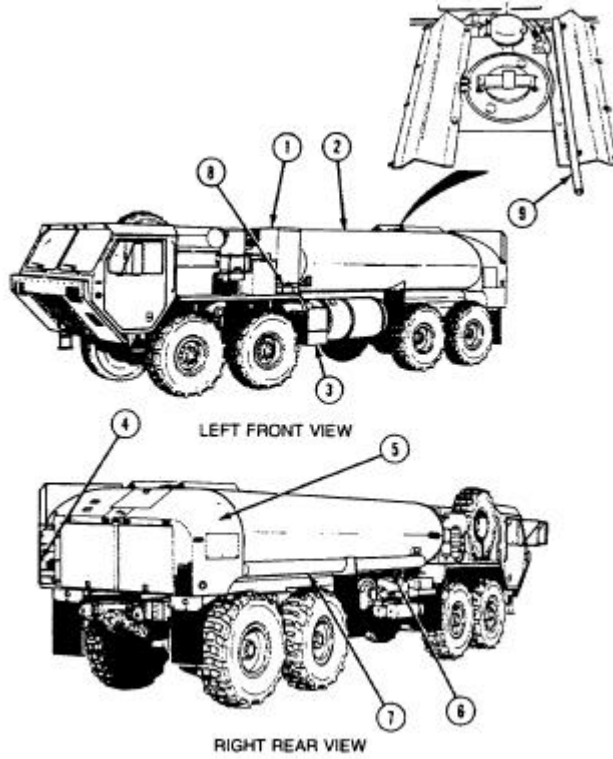
LEFT FRONT VIEW



RIGHT REAR VIEW

- 1. STOWAGE BOXES
- 2. ACCESS LADDER
- 3. CARGO BODY
- 4. MATERIAL HANDLING CRANE

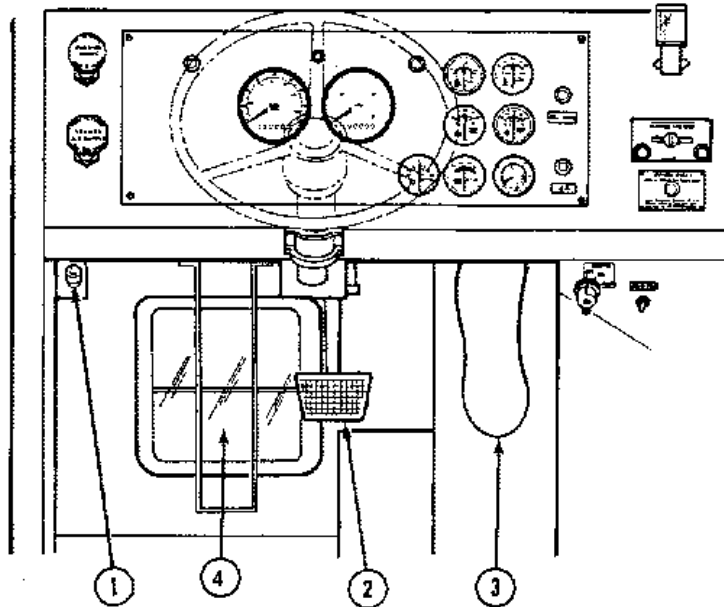
HEMTT 1-4 MAJOR COMPONENTS



- 1. STOWAGE BOX
- 2. TANK
- 3. STOWAGE BOX
- 4. TANK ACCESS LADDER
- 5. PUMP MODULE
- 6. ACCESS LADDER
- 7. STOWAGE COMPARTMENT
- 8. CHOCK STOWAGE BOX
- 9. DIPSTICK STOWAGE TUBE

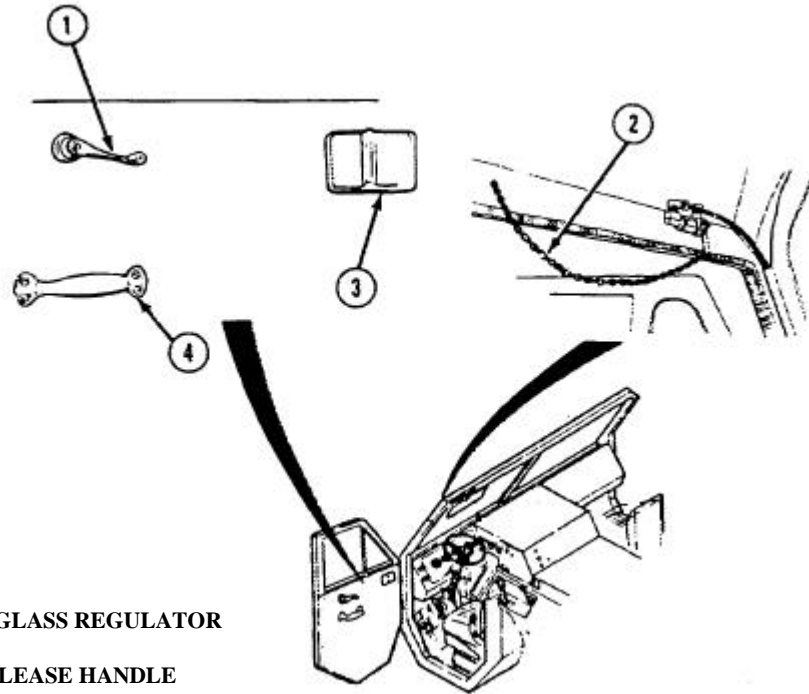
HEMTT 1-5

FOOT CONTROLS AND LOWER WINDOW



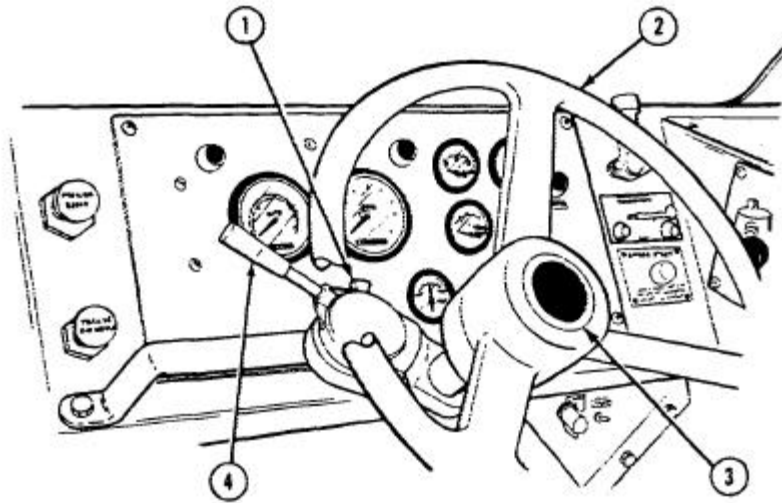
1. HEADLIGHT DIMMER SWITCH
2. SERVICE BRAKE PEDAL
3. ACCELERATOR PEDAL
4. FLOOR WINDOW

HEMTT 1-6
CAB MOUNTED HAND CONTROLS



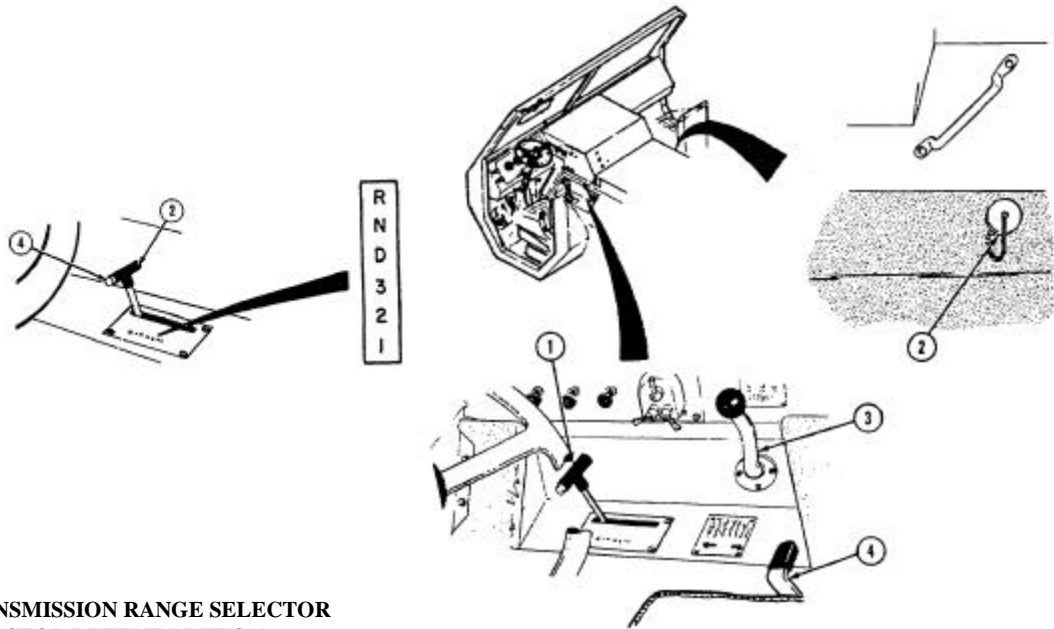
- 1. CAB DOOR WINDOW GLASS REGULATOR
- 2. AIR HORN CHAIN
- 3. CAB DOOR INSIDE RELEASE HANDLE
- 4. CAB DOOR HANDLE

HEMTT 1-7
STEERING COLUMN MOUNTED CONTROLS



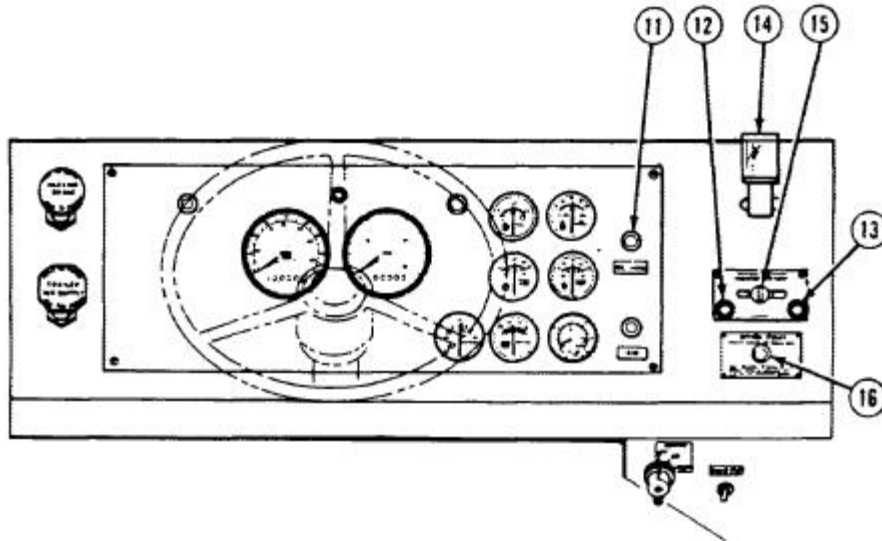
1. EMERGENCY FLASHER CONTROL
2. STEERING WHEEL
3. HORN BUTTON

HEMTT 1-8 TUNNEL PANEL CONTROLS



- 1. TRANSMISSION RANGE SELECTOR
- 2. SELECTOR DETENT BUTTON
- 3. STE/ICE RECEPTACLE
- 4. TRANSFER CASE SHIFT LEVER
- 5. SELF-RECOVERY WINCH LEVER

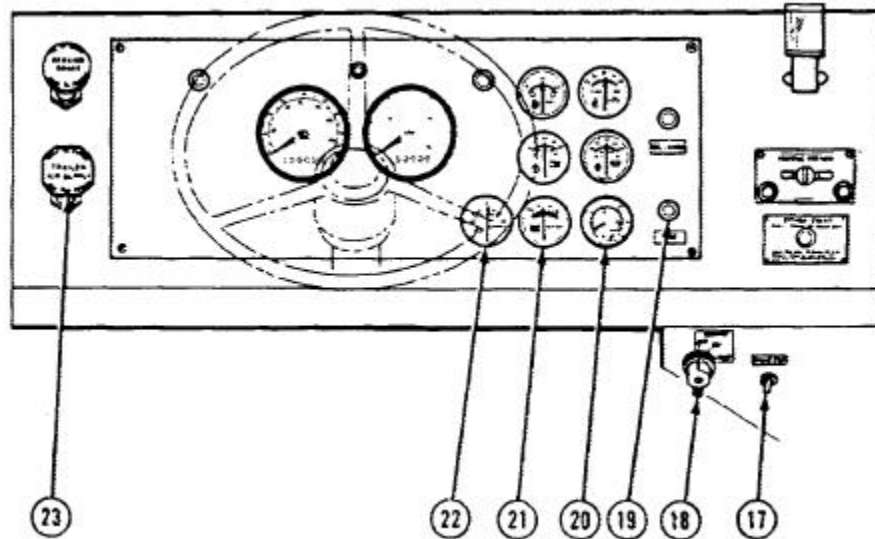
HEMTT 1-10
INSTRUMENT PANEL CONTROLS AND INDICATORS



- 11. OIL-WATER INDICATOR
- 12. INTER-AXLE DIFF. LOCK INDICATOR
- 13. 8X8 DRIVE INDICATOR

- 14. AIR FILTER RESTRICTION INDICATOR
- 15. TRACTION CONTROL
- 16. ETHER START CONTROL

HEMTT 1-11
INSTRUMENT PANEL CONTROLS AND INDICATORS

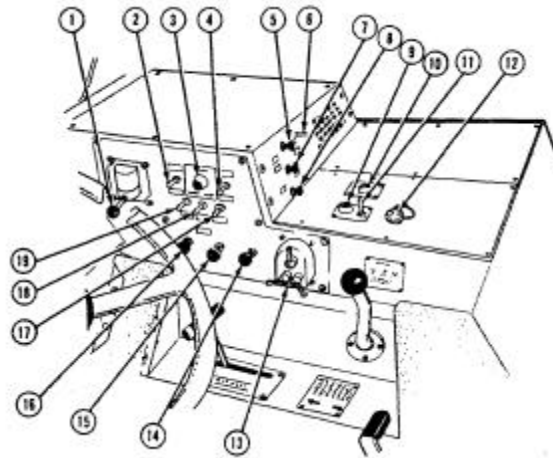


- 17. ENGINE STOP SWITCH
- 18. ENGINE START SWITCH
- 19. AIR INDICATOR
- 20. AIR PRESSURE GAUGE

- 21. BATTERY GAUGE
- 22. AMPERES GAUGE
- 23. TRAILER AIR SUPPLY CONTROL

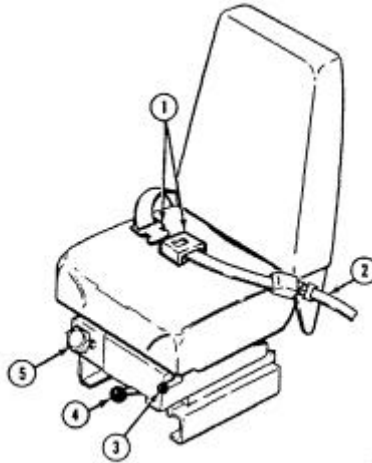
HEMTT 1-12

HEATER COMPARTMENT CONTROLS AND INDICATORS



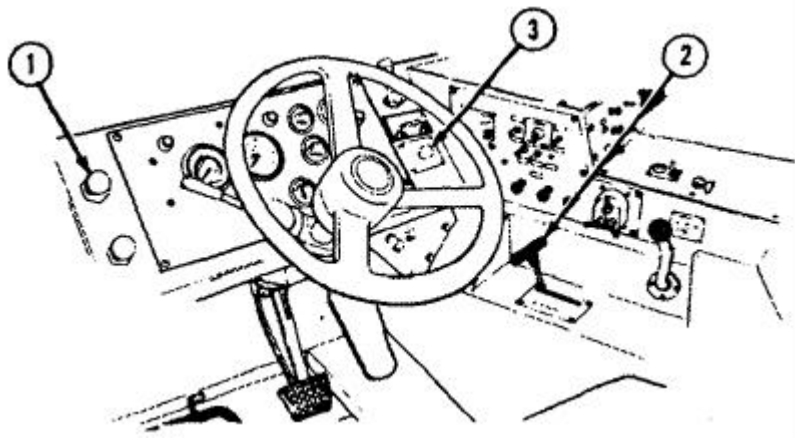
- | | |
|--|--|
| <ol style="list-style-type: none"> 1. TRAILER HANDBRAKE CONTROL 2. JACOBS ENGINE BRAKE ON-OFF SWITCH 3. JACOBS ENGINE BRAKE INDICATOR 4. JACOBS ENGINE BRAKE HIGH-LOW SWITCH 5. AIR CONTROL 6. FAN CONTROL 7. HEAT CONTROL 8. DEFROST CONTROL 9. PTO ENGAGE INDICATOR 10. CRANE OUTRIGGER EXTENDED INDICATOR | <ol style="list-style-type: none"> 11. PTO ENGAGE CONTROL 12. UTILITY OUTLET 13. LIGHT CONTROL 14. WASHER CONTROL 15. WIPER CONTROL (RIGHT) 16. WIPER CONTROL (LEFT) 17. WORK LIGHT SWITCH (NA) 18. DOMELIGHT SWITCH 19. CLEARANCE LAMPS SWITCH |
|--|--|

HEMTT 1-13
OPERATOR AND CREW SEAT ADJUSTMENT CONTROLS



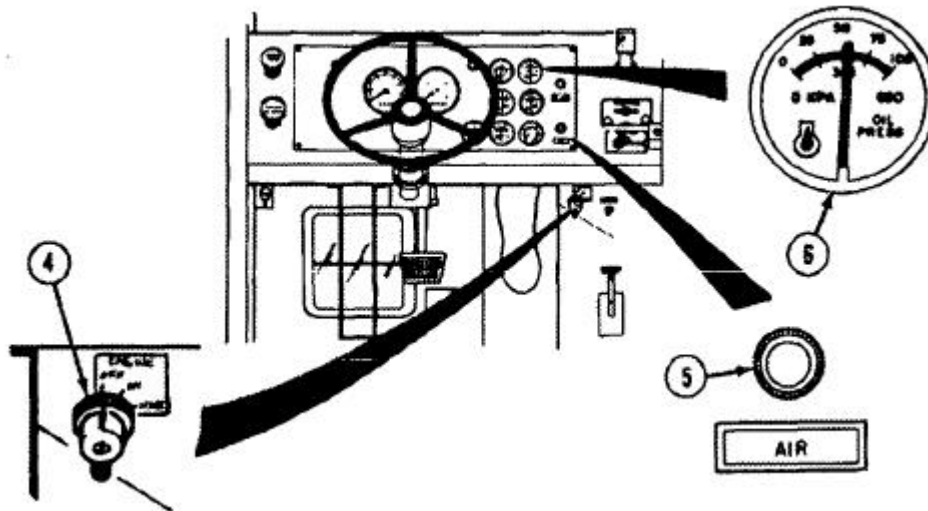
1. SEATBELT
2. SEAT CONNECTOR STRAP
3. HEIGHT ADJUSTMENT CONTROL
4. FORWARD/BACKWARD ADJUSTMENT CONTROL
5. RIDE ADJUSTMENT CONTROL

HEMTT 2-1 **ENGINE START**



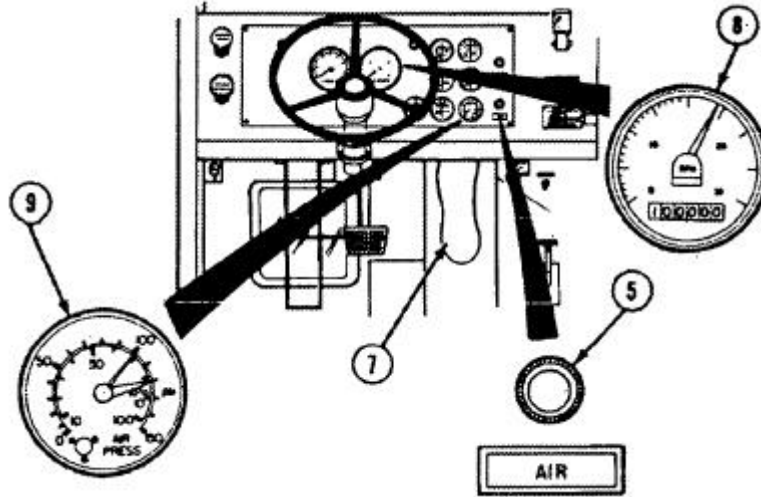
1. PARKING BRAKE CONTROL
2. TRANSMISSION RANGE LEVER
3. ETHER START BUTTON

HEMTT 2-2 ENGINE START



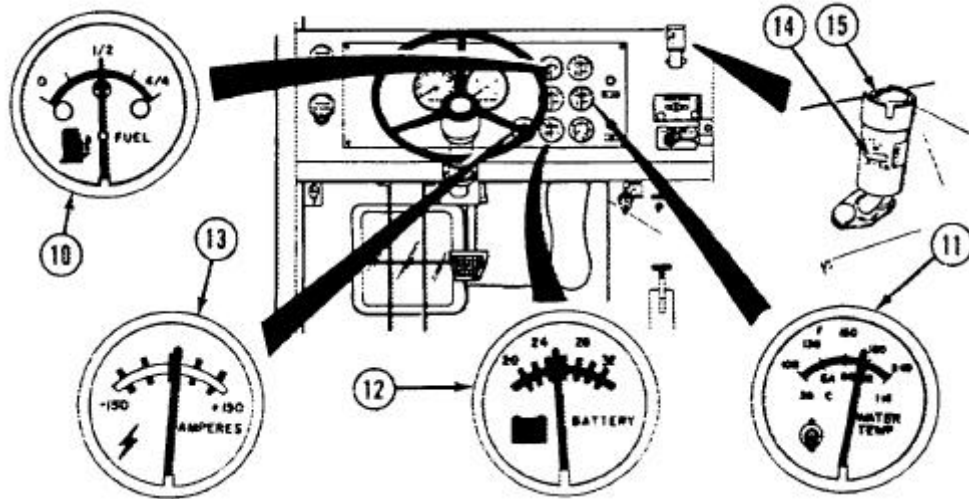
4. ENGINE START SWITCH
5. AIR PRESSURE INDICATOR
6. OIL PRESSURE GAUGE

HEMTT 2-3 **ENGINE START**



- 5. AIR PRESSURE INDICATOR
- 7. ACCELERATOR PEDAL
- 8. TACHOMETER
- 9. AIR PRESSURE GAUGE

HEMTT 2-4 ENGINE START



10. FUEL GAUGE

11. WATER TEMPERATURE GAUGE

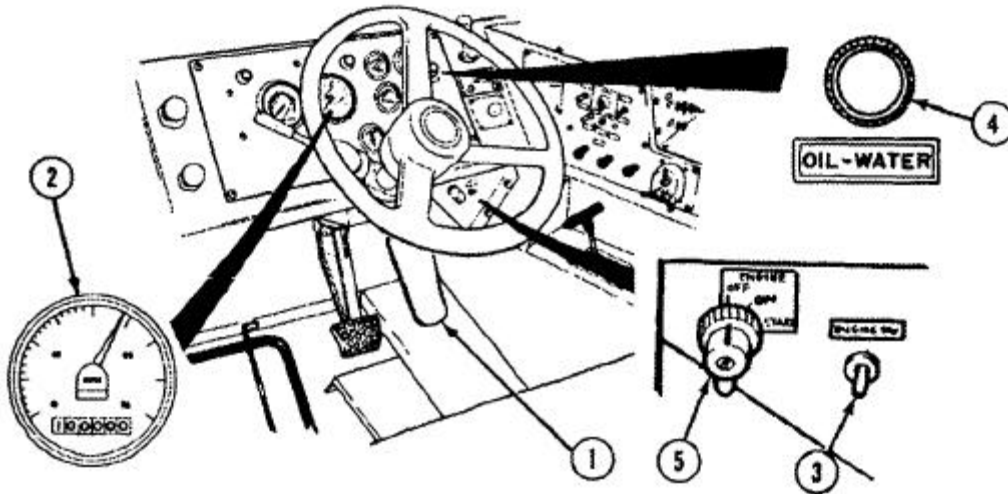
12. BATTERY GAUGE

13. AMPERES GAUGE

14. AIR FILTER RESTRICTION INDICATOR

15. RESET BUTTON

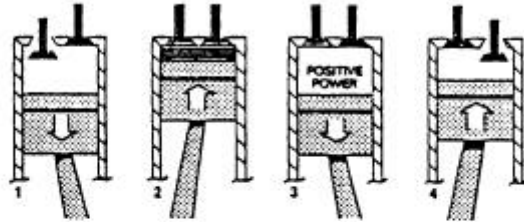
HEMTT 2-5 ENGINE SHUT OFF



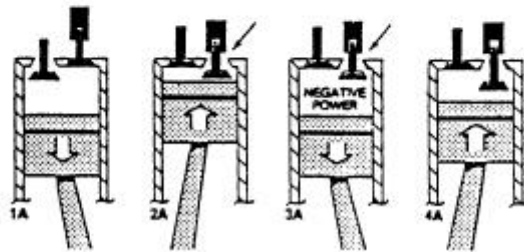
1. ACCELERATOR PEDAL
2. TACHOMETER
3. ENGINE STOP SWITCH
4. OIL-WATER INDICATOR
5. ENGINE SWITCH

HEMTT 3-1 ENGINE BRAKE OPERATION

WITHOUT ENGINE BRAKE

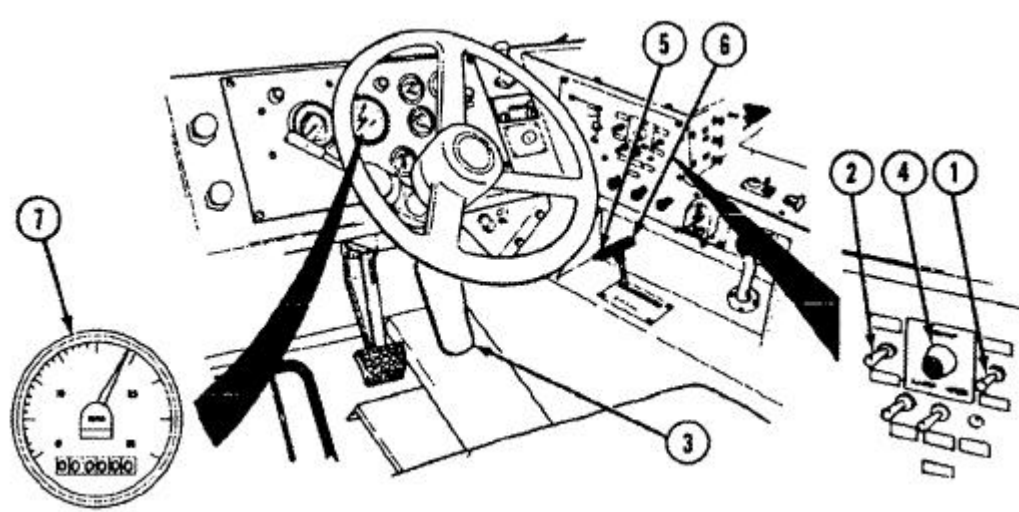


WITH ENGINE BRAKE 



HEMTT 3-2

ENGINE BRAKE OPERATION

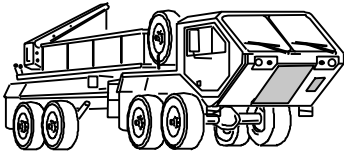


1. ENGINE BRAKE HIGH/LOW SWITCH
2. ENGINE BRAKE ON/OFF SWITCH
3. ACCELERATOR PEDAL
4. ENGINE BRAKE INDICATOR LIGHT

5. SELECTOR DETENT BUTTON
6. TRANSMISSION RANGE SELECTOR
7. TACHOMETER

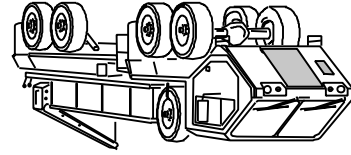
HEMTT 3-3
ENGINE BRAKE OPERATION GUIDELINES

- 1. DO NOT USE ENGINE BRAKE WITH COLD ENGINE.**
- 2. SELECT PROPER TRANSMISSION GEAR.**
- 3. BE AWARE OF SWITCH POSITIONS.**
- 4. USE CORRECT POSITION FOR ROAD SURFACE CONDITIONS.**
- 5. GET ACQUAINTED WITH "BRAKING FEEL".**
- 6. USE CORRECT GEAR ON DOWNGRADES.**
- 7. ALWAYS SHUT OFF SWITCH AFTER USE.**

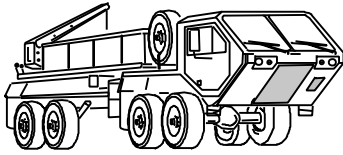


HEMTT 4-1 CRANE OPERATION

WARNINGS



1. Do not operate the crane unless both outriggers are set up. Vehicle could turn over causing serious injury or death. _____
2. Keep hands and body away from the outrigger beams while operating the outrigger extension lever or injury could result when the beams come out.
3. Be careful when removing the outrigger pads from their stowed position. Sharp edges can injure the hands.
4. When lowering the outrigger jack cylinders, keep hands and feet clear of the cylinders to avoid injury.
5. Do not raise the vehicle tires off the ground with the outrigger jack cylinders. The vehicle could roll causing serious injury or death. _____
6. The crane must be level from side to side. Use of the crane in an unlevel position can cause the vehicle to tip over causing possible serious injury or death.
7. Operate the crane from the forward or rear remote control station if the operator will not be able to see the load at all times during crane operation. Failure to control the boom while it is moving could cause serious injury or death. _____



HEMTT 4-2 **CRANE OPERATION**

WARNINGS

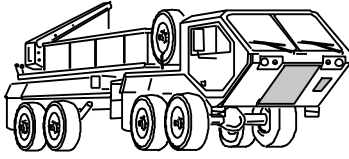
- 8. Keep the boom clear of all electrical lines and other obstacles while operating the crane. Serious injury or death could result upon contact.**

- 9. Be sure that the area is clear of personnel before moving the swing control lever. The boom should be swung slowly enough so the crane operator has complete control. If the operator cannot see the load during operation, operate the crane from the remote control unit. Failure to control the boom while it is moving could cause serious injury or death.**

- 10. The operator must keep control of the load at all times. If necessary, attach cargo tie downs to the load for use as a control tether. Failure to control the load while it is moving could cause serious injury or death.**

- 11. Make sure the remote control on/off/MHC-shutdown power switch is in the off position before connecting the remote control unit. Crane moving out of control could cause serious injury or death.**

- 12. Be sure there are at least two wraps of cable on the hoist drum at all times. Serious injury or death could result if the cable comes off the hoist drum while lifting a load.**

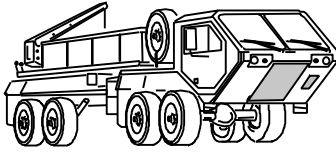


HEMTT 4-3 CRANE OPERATION

WARNINGS

- 13. The operator should use the remote control unit in a position that the load will not pass overhead. The load could fall causing serious injury or death.**

- 14. If the electrical power fails during crane operation, move the switch on the remote control unit to the shutdown position. Serious injury could result from uncontrolled moving parts.**

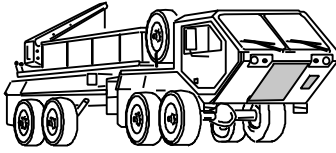


HEMTT 5-1

WINCH OPERATION

WARNINGS

- 1. Always wear heavy gloves when handling the winch cable. Never let the moving cable slide through the hands, even when wearing gloves. A broken cable could cut through the glove and cut the hand severely.**
- 2. Never operate the winch with less than five wraps of cable on the winch drum. Serious injury or death could result if the cable comes off the drum while winching.**
- 3. Avoid quick, jerking winch operation. Keep other personnel well away from the vehicle involved in the winching operation. A snapped cable or shifting load can cause serious injury or death.**
- 4. Do not operate the winch while personnel are working on or around the tensioning device. Severe injury to arms, hands, and fingers may result if the cable moves while working with the cable and tensioning device.**
- 5. Keep all personnel clear of the area near the cable when tension is on the cable (at least one cable length away from and opposite the angle of pull). If the cable breaks, it can cause severe injury or death.**



HEMTT 5-2

WINCH OPERATION

WARNINGS

- 6. Do not use the winch to reel the clevis end of the cable through the roller guides. The clevis may catch on the roller guide and cause the cable or roller guide to break. Broken cables or roller guides can cause serious injury or death.**
- 7. Keep all personnel clear of the winch area when the winch is reeling in the cable. If hands are caught in the winch or the cable, or if the cable breaks under tension, severe injury or death could occur.**
- 8. Do not reel in the cable too tightly. If too much tension is applied, the cable or tiedown ring can break causing severe injury to personnel.**

APPENDIX B

HEMTT ACCIDENT ARTICLES

Information contained in this appendix may be used to enhance instruction contained within this TC. This information was extracted from the following "Countermeasure, Army Ground Accident Reports":

- Article 1 -- Volume 10 Number 5, Issue 89-5.
- Articles 2, 3, and 4 -- Volume 14 Number 6, Issue June 1993.

ARTICLE 1 -- COSTLY HEMTT ROLLOVERS ARE PREVENTABLE

Rolling over a HEMTT can be very expensive. More than 50 HEMTT rollover accidents were recorded in their first 5 years of use. Some of these accidents are as follows:

- As the driver moved to the right to let a convoy pass, the soft shoulder of the road gave way. This caused the vehicle to slide off the right side of the road and flip over.
- As the driver moved as far to the right side of the road as he could to allow the tanks to pass (he had 2,400 gallons of diesel fuel in his truck) the side of the road gave way beneath the load. The truck slowly rolled onto its side.
- As the driver completed a left turn too close to the left shoulder of the road, the left bank collapsed under the weight of the vehicle. The HEMTT rolled into a pond and came to a rest, upside down.
- The driver was attempting a right turn on a 10-foot wide dirt road when the rear wheels slid off the edge. The ground gave way and the HEMTT, which was full of fuel, began to roll. It rolled over two times, coming to rest 40 feet below the road.

If all those accidents sound alike its because they are, and the logical conclusions to be drawn are the following:

- A HEMTT driver should make determined efforts to keep the vehicle on the roadway and away from the edge.
- This principle needs to be given special emphasis in driver training for HEMTT operators. With most other vehicles, staying on the hard surface may not be so important, but the HEMTT is a unique vehicle. It has a high center of gravity, and the "lightest" model (an empty M983 without crane) weighs 32,200 pounds. In a word, "Heavy" is this truck's first name, and it must always be driven with that in mind.
- Because the HEMTTs normal operating environment is the tactical training area, keeping the vehicle under control and upright often calls for a good measure of judgment on the driver's part. When he encounters oncoming traffic on narrow tank trails and back roads, he should decide how far he can safely move to the right. He should then move there, and stop and wait until the other vehicles have passed. He can then resume travel on the most solid portion of the road.

- If the road is so narrow that something must pass on the shoulder, in most cases, that something should not be a HEMTT. Most wheeled vehicles are lighter and have a lower center of gravity; they are thus less likely to cause a cave-in or to rollover. As for tanks, traveling on rough terrain is what they do best.
- In spite of its rollover record, from the standpoint of injuries, the HEMTT is proving to be a big improvement over its predecessor, the GOER. In more than one-third of GOER rollover accidents, the driver was killed. Until 28 July 1989, when the first fatality occurred, no HEMTT driver or passenger had been killed in an accident, rollover, or otherwise.
- To keep injuries down, and to save vehicle damage costs averaging more than \$20,000 per accident, driver training should stress, and HEMTT drivers should pay close and constant attention to countermeasures to prevent rollovers and other accidents. Besides staying on the road, actions indicated by a review of accident records include the following:

√- Adjust speed for road and environmental conditions. Slow down for rough terrain, rain or snow, or anything else that reduces visibility, especially curves and corners.

√- Know how to use the Jacobs engine brake along with the wheel brakes to control speed when going downhill. Check that the tachometer reads between 1,650 and 2,100 RPM whenever the engine brake is used. If TOO MUCH braking occurs, set the transmission range selector to a higher range. If MORE braking is required, set the engine brake high/low switch to high.

√- In a convoy, maintain the proper distance between vehicles as prescribed by the convoy commander. Also, STAY ALERT! THE HEMTT appears to have a special talent for rear-ending other HEMTTs.

√- Have at least one ground guide when backing. The driver must keep the ground guide in his sight at all times. The ground guide should stay out of the vehicle's path of travel when possible; if not, he should maintain a distance of at least 10 yards.

ARTICLE 2 -- HEMTT ROLLOVERS ARE ON THE RISE

A soldier was driving an M978 HEMTT fuel tanker, which was second in a three-vehicle convoy, along a narrow forest road. The mission was to set up a FARP for a special mission in a national forest. The convoy was met by an oncoming civilian pickup. The driver pulled his truck onto the shoulder and stopped to let the convoy pass. The lead vehicle moved to the right and passed the pickup, and the HEMTT followed. When the right side of the HEMTT moved onto the shoulder, the tanker began to sink in dirt made soft by recent rains. The tanker then slid 30 feet down an embankment, hitting several large trees in the process. The assistant driver was killed when the right side of the cab was crushed. The driver received only minor injuries.

There is a reason the HEMTT is called a heavy expanded mobility tactical truck. A HEMTT tanker full of fuel needs a good solid surface to support its 62,000 pounds, and soft shoulders simply do not qualify.

A 1989 Countermeasure article reported a rash of HEMTT rollovers associated with road-edge cave-ins and pointed out the need to discuss this very real danger as a part of every HEMTT driver's training. A follow-up analysis of HEMTT accidents in the last 3 years shows rollovers have increased from an average of 10 a year to 12 a year. This latest tragic accident is an example of the potential cost when a driver does not know or appreciate the hazards.

In fact, not just the HEMTT driver but everyone involved in HEMTT operations needs to know about the vehicle's limitations and the necessity to keep it on solid ground. The selected route for the FARP mission did not allow for two-way traffic. The task force operations officer should have ensured a thorough reconnaissance was conducted and established procedures for dealing with oncoming traffic.

In another accident, the driver of an M977 cargo HEMTT was following the blackout drive lights of the lead HMMWV at a 100 meter distance on a dusty tank trail. He was not wearing night vision goggles. The trail inclined to the left, where its edge dropped off into a pool of water 12 feet below. The HEMTT went off the edge and flipped upside down. The driver was trapped in the cab in 30 degree water for about 20 minutes. Besides suffering exposure, shock, and hypothermia, he came down with pneumonia caused by inhaling a mixture of water and fuel.

Another rollover resulted in more than \$100,000 damage due to driver (and assistant driver) error. The two were returning from a refueling mission in an M978 HEMTT when the windshield wipers failed during a rainstorm. The crew continued on even though they could not see the road. Where the road went left, the HEMTT driver went right. The front tires sank into the soft ground, and the HEMTT flipped over. The occupants were wearing their seat belts and were not injured.

None of the Army's tactical vehicles meet the criterion that "anybody with a state license can drive one," and the HEMTT, especially, is a far cry from the everyday sedan or truck. Only a driver thoroughly trained in all handling and other unique characteristics of each model can safely operate one.

TC 21-305-1 is available through normal publications channels. Drivers should also be thoroughly familiar with the operator's manual, TM 9-2320-279-10-1. Drivers should also make "Stay away from the road edge" their byword.

ARTICLE 3 -- NO NEW ACCIDENTS FOR HEMTT DRIVERS

Problems that showed up frequently in the last 3 years in HEMTT accidents are the same ones seen in an earlier analysis. All are usually preventable using risk-management techniques.

- Driving too fast for conditions. It was dusk and raining when an M977 cargo HEMTT entered a curve too fast for road conditions. The driver lost control and the vehicle ended up hitting a tree, a fire hydrant, a pole, and a brick wall. Total damage was \$13,000.
- Following too close and improper use of brakes. An M978 HEMTT was following another HEMTT in congested, stop-and-go traffic. A vehicle cut in front of the lead HEMTT and the driver slammed on the brakes. The following HEMTT driver hit his brakes also, but nothing happened. He put the Jake brake in high and the transmission in neutral. He then swerved to the right, but his vehicle hit the back of the other HEMTT, causing \$8,800 in damage. In stop-and-go-traffic, the air brakes are likely to keep losing pressure and be unable to regenerate pressure as fast as it is lost.

- Failure to use--or to heed--a ground guide. The driver was backing a HEMTT that was towing a HEMTT tanker. He was not paying full attention to his ground guide and turned too sharply, failing to hear the ground guide's warning. The tanker hit an M923A2 5-ton cargo truck, causing extensive front-end damage.

The good news is that, in all three of these examples, the HEMTT occupants were wearing safety belts, and there were no injuries.

ARTICLE 4 -- HEMTT ACCIDENT PROFILE

Since 1986, 382 accidents have resulted in 9 fatalities and 126 injuries. Many of them were costly, at a price of \$8.8 million.

- Top accident causes:
 - √- Driving too fast for conditions.
 - √- Not paying attention.
 - √- Following too close.
 - √- Improper use of brakes.
 - √- Failure to use a ground guide.
- Risk management for leaders:
 - √- Ensure HEMTT drivers are thoroughly trained.
 - √- Use safety briefings to emphasize controlling speed and driving attentively.
 - √- Identify and control hazards through advance planning; reassess before and during mission.
- Risk management for individuals:
 - √- Know as much as possible about the vehicle, the mission, and the route.
 - √- Give full attention to driving.

The supervisor may put controls into the plans, but the individual puts them into action.

GLOSSARY

AAR after-action review
AR Army regulation
ATTN attention
BII basic issue items
C centigrade; celsius
D drive
DA Department of the Army
DD Department of Defense
DIFF. differential
EOCCT end of course comprehensive test
F Fahrenheit
FARP forward area refueling point
FM field manual
GOER nickname for a large tactical truck that was replaced by the HEMTT
HEMTT heavy expanded mobility tactical truck
HMMWV high mobility multipurpose wheeled vehicle
HI high
Jake brake engine brake
KPH kilometers per hour
kPa kilopascal
LO low; lubrication order
METT-T mission, enemy, terrain, troops, and time available
MHC material handling crane
MPH miles per hour
N neutral
NA not applicable
No. number
OF optional form
P park
PIN production identification number
PMCS preventive maintenance checks and services
POL petroleum, oils, and lubricants
PSI pounds per square inch
PTO power take-off
R reverse
RPM revolutions per minute
S simulated
SOP standing operating procedure
SRW self recovery winch
STE/ICE simplified test equipment/internal combustion engine
TC training circular
TM technical manual
TVT training videotape
US United States (of America)
VCR video cassette recorder

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3 OCTOBER 1995

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:



Handwritten signature of Joel B. Hudson in black ink.

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army

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