

**TRAINING PROGRAM FOR
EQUIPMENT TRANSPORTERS
(C-HET, MET, AND LET**

DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited

HEADQUARTERS, DEPARTMENT OF THE ARMY

**TRAINING PROGRAM FOR EQUIPMENT TRANSPORTERS
(C-HET, MET, AND LET)**

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PREFACE

The driver of a light-, medium-, or heavy-equipment transporter is charged with an awesome responsibility. Not only will he be driving one of the largest vehicles in the Army's vehicle fleet but also one of the heaviest vehicles. Therefore, as a prerequisite, the individual must have been qualified and licensed to operate a 5-ton tractor and semitrailer for at least one year before receiving a license to operate an equipment transporter.

Therefore, this TC provides standardized driver training and testing for the light-, medium-, and heavy-equipment transporter operator. This TC stresses hands-on training with minimal classroom instruction. It does not include any theater unique requirements.

The lesson outlines are used to teach the novice (inexperienced) driver to operate the light-, medium-, and/or heavy-equipment transporter. They can also be used to teach the apprentice driver. (The apprentice driver is defined as a driver that has been driving military vehicles for at least one year.) The apprentice driver may learn to operate the light-, medium-, and/or heavy-equipment transporter in less time than the novice assuming that skills learned on other military vehicles are positive skills transferable to operating light-, medium-, and/or heavy-equipment transporter.

NOTE: The trainer must be aware that a positive transfer of skills does not always occur. Conceivably, the apprentice driver might need MORE training than the novice driver to safely operate the light-, medium-, and/or heavy-equipment transporters.

To effectively execute this program, each instructor should ensure the light-, medium-, and/or heavy-equipment transporter operators are trained and tested to the standards in this TC. This TC was specifically designed for the light-, medium-, and heavy-equipment transporter to include PMCS and vehicle operations. Any deviation from the successful completion of these basic standards will only lessen the soldier's overall driving effectiveness.

Additionally, we recommend graduates (licensed drivers) of this program be supervised until they have gained the experience to operate safely and should not be placed in situations that may be above their skill level. Periodically, the supervisor should ride with each of the drivers 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 Publication and Blank Forms) and forward it to Commandant, US Army Transportation School, ATSP-TDX, Fort Eustis, Virginia 23604-5001.

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

CHAPTER 1

RISK MANAGEMENT

1-1. BACKGROUND. Leaders at all levels 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 risks requires that leaders minimize or balance risks with essential mission needs.

1-2. DEFINITION. Risk is the possibility of a loss. The loss can be death, injury, property damage, or mission failure. Risk management is the identification of risks associated with a particular operation and the requirement to weigh these risks against the overall training value to be gained. There are three risk management basics--

- a. Accept no unnecessary risk.
- b. Accept necessary risks that produce a net Army benefit.
- c. Make risk decisions at the proper command level.

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

- a. Detect hazards and associated risks. Look for risks in each phase of the training or operations.
- b. Assess the risk. Ask these questions:
 - What is the likelihood of a mishap?
 - What degree of injury or equipment damage is possible?

NOTE: A low likelihood of a mishap and a high probability of minor injury equals low risk. A low likelihood of a mishap and a high probability of a fatality equals high risk.

- c. Develop risk control alternates and make risk decisions. If the risk cannot be eliminated, then it must be controlled without sacrificing essential mission requirements. Some risks can be controlled by modifying task standards, operational procedures, training requirements, maintenance standards, and so forth. Decisions take several forms:
 - Selecting from available controls.
 - Trading off mission elements against risk controls.
 - Determining if controls reduce the risk to an acceptable level considering the mission benefits.

d. Implement the risk control measures. Procedures for controlling risks must be integrated into plans, orders, SOPs, and training. They must also be integrated into other means to ensure that the risk reduction measures will be used during actual operations.

e. Supervise the operations. Leaders use the same supervision techniques such as on-the-scene spot-checks and performance indicators, to monitor risk controls that they use to monitor overall operations.

f. Evaluate the results. Include the effectiveness of risk management controls in the assessment of operational results.

1-4. RISK ASSESSMENT ELEMENTS. There are no hard and fast rules for assessing risks. Different training tasks involve different elements that can affect training safety. However, seven elements are central to the safe completion of most driver training tasks: SOLDIER QUALIFICATION, VEHICLE TYPE, WEATHER, TERRAIN, SUPERVISION, EQUIPMENT, and TIME OF DAY. Using matrices that assign a numerical value to each of the elements is one way to quickly gain an appreciation of the overall risks. The following matrices offer examples of risk assessments for each of the seven elements common to driver training missions.

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

a. Soldier qualification is measured by comparing the level of task difficulty to the soldier's military driving experience.

SOLDIER QUALIFICATION RISK VALUE			
DRIVING EXPERIENCE			
TASK	LICENSED OVER 1 YEAR	LICENSED UNDER 1 YEAR	UNLICENSED
COMPLEX	3	4	5
ROUTINE	2	3	4
SIMPLE	1	2	3

EXAMPLE: Unlicensed drivers learning downhill braking techniques in a HET would receive a risk value of 5.

b. Vehicle type is measured by comparing the vehicle configuration to the location of the training tasks.

VEHICLE TYPE RISK VALUE			
VEHICLE CONFIGURATION			
LOCATION OF TRAINING	LIGHT TRUCKS	MEDIUM TRUCKS	TRACTOR/ SEMITRAILERS
ROAD	3	4	5
TRAINING AREA	2	3	4
MOTOR POOL	1	1	1

EXAMPLE: Driving an M911 tractor and semitrailer over the road would have a risk value of 5.

c. Weather is measured by comparing temperature with moisture/visibility conditions.

WEATHER RISK VALUE			
VISIBILITY/MOISTURE			
TEMPERATURE FAHRENHEIT	CLEAR DRY	FOG/HUMID/ DRIZZLE	DUST/RAIN/ SNOW/ICE
0-31° or 90°+	3	4	5
32°-59°	2	3	5
60°-89°	1	3	5

EXAMPLE: A task conducted outdoors at a temperature of 20 degrees Fahrenheit with snow or ice would receive a risk value of 5.

d. Terrain is measured by comparing the physical features of the land with the road network that exists in the area.

TERRAIN RISK VALUE			
TRAFFICABILITY			
TYPE OF TERRAIN	STREETS/ HIGHWAYS	CONGESTED STREETS/HIGHWAYS	TRAILS CROSS-COUNTRY
JUNGLE/MOUNTAINS/ DESERTS	3	4	5
HILLS	2	4	4
FLAT/ROLLING	1	3	3

EXAMPLE: Driver training conducted at Fort Bragg over trails would have a risk value of 3.

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e. Supervision is measured by comparing the instructor to student ratio to the location of the training tasks.

SUPERVISION RISK VALUE			
INSTRUCTOR-TO-STUDENT RATIO	CLASSROOM	TRAINING AREA/ MOTOR POOL	ON/OFF ROAD
LOW	3	4	5
AVERAGE	2	3	4
HIGH	1	2	3

EXAMPLE: An instructor to student ratio of 1:8 for on-road driving would have a risk value of 5.

f. Equipment is measured by comparing the age of the equipment to the maintenance level.

EQUIPMENT RISK VALUE			
EQUIPMENT AGE	C-1	C-2	C-3
OLD	3	4	5
AVERAGE	2	3	4
NEW	1	2	3

EXAMPLE: A 20-year-old M911, maintained as C-2, would have a risk value of 4.

g. Time of day is measured by comparing the level of light to familiarity with the route.

TIME OF DAY RISK VALUE			
ROUTE FAMILIARITY	DAY	DAWN/DUSK	NIGHT
NEVER DRIVEN ROUTE	3	4	5
DRIVEN ROUTE 1-3 TIMES	2	3	4
FAMILIAR ROUTE	1	2	3

EXAMPLE: A driving task over a familiar route that starts during the day but ends at dusk would have a risk value of 2.

h. After assessing all the risks, total the value and apply it to a quick-reference gauge.

QUICK REFERENCE GAUGE			
RISK LEVEL VALUES	LOW RISK	CAUTION	HIGH RISK
	7-12	13-18	19-35

When two or more elements have a risk value of 5, consider the overall rating as high risk. (A risk value of 5 signifies hazards inherent in that task and should be analyzed for ways to reduce or eliminate the danger.)

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 assist in determining the leadership decision-making level.

DECISION AID		
RISK	POINTS	DECISION LEVEL
LOW	7-12	SENIOR INSTRUCTOR
CAUTION	13-18	COMPANY COMMANDER
HIGH	19-35	BATTALION COMMANDER

- a. Operations with a value of 7 to 12 are low risk, and normal standing operating procedures (SOPs) apply.
- b. A value of 13 to 18 is a caution area. Complete unit command involvement is warranted. Give a caution rating special consideration if one or two elements have significantly raised the overall risk level. For example, a risk value of 4 in the weather element category indicates the soldiers are more susceptible to cold injuries and require closer supervision. If you cannot lower the risk level, the company commander must approve the training mission.
- c. Operations with a value of 19 to 35 or that have two or more areas with a risk value of 5 are high risk. Procedures in b above apply. If you risk level cannot be lowered, the battalion commander must approve the mission.

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

- a. Eliminate the hazard. Eliminate the hazard totally, if possible, or substitute a less hazardous alternative.
- b. Control the hazard. Reduce the magnitude of the hazard or provide barriers.
- c. Change operational procedures. Modify operational procedures to minimize risk exposure consistent with mission needs.
- d. Educate. Train personnel to use effective hazard avoidance actions.
- e. Motivate. Motivate personnel to use effective hazard avoidance actions.

1-7. RISK CONTROL MEASURES. Leaders must monitor the training to ensure that risk control measures are followed. Never underestimate the ability of subordinates to sidetrack a decision they do not understand or support. You will also need to monitor the impact of risk reduction procedures when they are implemented to verify that they really are a good idea. This is especially true of new and untested procedures.

1-8. PAYOFFS. Risk management permits the executions of realistic training scenarios not possible without risk management procedure due to high potential cost in accidents. It also minimizes personnel and materiel losses in day-to-day training activities.

SAMPLE RISK ASSESSMENT WORK SHEET

TRAINING TASK: _____

POINTS:

_____ 1. SOLDIER QUALIFICATION

TASK	LICENSED OVER 1 YEAR	LICENSED UNDER 1 YEAR	UNLICENSED
COMPLEX	3	4	5
ROUTINE	2	3	4
SIMPLE	1	2	3

_____ 2. VEHICLE TYPE

LOCATION OF TRAINING	LIGHT TRUCKS	MEDIUM TRUCKS	TRACTOR/ SEMITRAILERS
ROAD	3	4	5
TRAINING AREA	2	3	4
MOTOR POOL	1	1	1

_____ 3. WEATHER

TEMPERATURE FAHRENHEIT	CLEAR/ DRY	FOG/HUMID/ DRIZZLE	DUST/RAIN/ SNOW/ICE
0-31° OR 90°+	3	4	5
32°-59°	2	3	5
60°-89°	1	3	5

_____ 4. TERRAIN

TYPE OF TERRAIN	STREETS/ HIGHWAYS	CONGESTED STREETS/HIGHWAYS	TRAILS/ CROSS-COUNTRY
JUNGLE/MOUNTAINS/ DESERTS	3	4	5
HILLS	2	4	4
FLAT/ROLLING	1	3	3

_____ 5. SUPERVISION

INSTRUCTOR-TO-STUDENT RATIO	CLASSROOM	TRAINING AREA/ MOTOR POOL	ON/OFF ROAD
LOW	3	4	5
AVERAGE	2	3	4
HIGH	1	2	3

_____ 6. EQUIPMENT

EQUIPMENT AGE	C-1	C-2	C-3
OLD	3	4	5
AVERAGE	2	3	4
NEW	1	2	3

_____ 7. TIME OF DAY

ROUTE FAMILIARITY	DAY	DAWN/DUSK	NIGHT
NEVER DRIVEN ROUTE	3	4	5
DRIVEN ROUTE 1-3 TIMES	2	3	4
FAMILIAR ROUTE	1	2	3

_____ **TOTAL POINTS**

QUICK REFERENCE GAUGE			
RISK LEVEL VALUES	LOW RISK 7-12	CAUTION 13-18	HIGH RISK 19-35

DECISION AID		
RISK	POINTS	DECISION LEVEL
LOW	7-12	SENIOR INSTRUCTOR
CAUTION	13-18	COMPANY COMMANDER
HIGH	19-35	BATTALION COMMANDER

APPROVED BY: _____ **DATE:** _____

CHAPTER 2
INSTRUCTIONAL AIDS

1. Student Requirements:

a. Vehicles per student:

Commercial heavy-equipment transporter (C-HET), M911 coupled to an M747 semitrailer; light-equipment transporter (LET), M916 coupled to M172A1 semitrailer; or medium-equipment transporter (MET), M920 coupled to M870 semitrailer for every two students.

M1 main battle tank.
MW24C scoop loader.
D8K dozer.

b. Forms per student:

DD Form 1970.
DA Form 2404.

c. Publications per student:

TM 5-2330-360-14P.
TM 9-2320-270-10.
TM 9-2320-273-10.
TM 9-2330-211-14P.
TM 9-2330-294-14.
TM 55-2350-255-14.
TM 55-2410-234-14.
TM 55-3805-262-14.
LO 9-2320-270-12.
LO 9-2320-273-12.

d. Nonstandard items:

Work gloves.
Forty empty POL drums, traffic cones, or locally fabricated standards.
Hearing protection.

2. Instructor Requirements.

One each of the above forms.
One each of the above publications.
AR 385-30.
DA Pamphlet 738-750.
FM 21-60.
FM 21-305.
FM 55-312.
All host-nation or local directives and regulations.

3. Training Facilities:

Classroom.
Motor pool.
Training area(s).
Suitable roadnet for driver training and convoys.

4. Training Aids and Devices:

Television monitor.
Videocassette player.
Overhead projector.
Projection screen.
Videotape TVT 55-19, PIN: 709236 DA, "Equipment Transporter PMCS."
Videotape TVT 55-20, PIN: 709237 DA, "Coupling and Uncoupling the Equipment Transporter."
Videotape TVT 55-21, PIN: 709238 DA, "Loading and Unloading Equipment Transporter."
Videotape TVT 55-22, PIN: 709239 DA, "Driving a Loaded Equipment Transporter."

CHAPTER 3

SAMPLE TRAINING SCHEDULE

<u>WHEN</u>	<u>WHAT</u>	<u>WHERE</u>	<u>TASK NUMBER</u>
DAY 1			
0730-0900	Use Technical Manuals, Lubrication Orders, and Make Entries on DA Form 2404	Classroom	551-721-1352
0900-1000	Observe Safety Rules and Procedures for Driving Under Adverse Conditions	Classroom	551-721-1369
1000-1130	Identify Instruments, Controls, and Indicators	Motor Pool	551-721-1352
1230-1430	Perform Vehicle Preventive Maintenance Checks and Services (PMCS)	Classroom/ Motor Pool	551-721-1352
1430-1630	Perform Preventive Maintenance Checks and Services (PMCS) on Trailers	Motor Pool	551-721-1353
DAY 2			
0730-0800	Perform Before-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
0800-1130	Drive Vehicle with Automatic or Semiautomatic Transmission	Training Area	551-721-1364
1230-1300	Couple Semitrailer	Classroom	551-721-1314
1300-1330	Uncouple Semitrailer	Classroom	551-721-1315
1330-1600	Couple/Uncouple Semitrailer	Training Area	551-721-1314 551-721-1315
1600-1630	Perform After-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
DAY 3			
0730-0800	Perform Before-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
0800-1130	Drive a Tractor Semitrailer Combination Without a Load on Improved (Primary) Roads	Driving Route	551-721-3337
1230-1400	Drive a Tractor Semitrailer Combination Without a Load on Improved (Primary) Roads	Driving Route	551-721-3337
1400-1600	Couple/Uncouple Semitrailer	Training Area	551-721-1314 551-721-1315

<u>WHEN</u>	<u>WHAT</u>	<u>WHERE</u>	<u>TASK NUMBER</u>
1600-1630	Perform After-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
DAY 4			
0730-0800	Perform Before-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
0800-1130	Back a Tractor Semitrailer Combination Without a Load	Training Area	551-721-1367
1230-1600	Drive a Tractor Semitrailer Combination Without a Load on Improved (Primary) Roads	Driving Route	551-721-3337
1600-1630	Perform After-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
DAY 5			
0730-0800	Perform Before-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
0800-1130	Drive a Tractor Semitrailer Combination Without a Load on Improved (Primary) Roads	Driving Route	551-721-3337
1230-1600	Drive a Tractor Semitrailer Combination Without a Load on Unimproved (Secondary) Roads	Driving Route	551-721-1368
1600-1630	Perform After-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
DAY 6			
0730-0800	Load Equipment on a Semitrailer	Classroom	551-721-3345
0800-0830	Perform Before-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
0830-1130	Load Equipment on a Semitrailer	Training Area	551-721-3345
1230-1600	Drive a Tractor Semitrailer Combination Loaded on Improved (Primary) Roads	Driving Route	551-721-3337
1600-1630	Perform After-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
DAY 7			
0730-0800	Perform Before-Operation PMCS	Motor Pool	551-721-1352 551-721-1353

<u>WHEN</u>	<u>WHAT</u>	<u>WHERE</u>	<u>TASK NUMBER</u>
0800-1130	Drive a Tractor Semitrailer Combination Loaded on Improved (Primary) Roads	Driving Route	551-721-3337
1230-1600	Drive a Tractor Semitrailer Combination Loaded on Improved (Primary) Roads	Driving Route	551-721-3337
1600-1630	Perform After-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
DAY 8			
0730-0800	Perform Before-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
0800-1130	Back a Loaded Tractor Semitrailer Combination	Training Area	551-721-1367
1230-1430	Back a Loaded Tractor Semitrailer Combination	Training Area	551-721-1367
1430-1600	Drive a Tractor Semitrailer Combination Loaded on Improved (Primary) Roads	Driving Route	551-721-3337
1600-1630	Perform After-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
DAY 9			
0730-0800	Perform Before-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
0800-1130	Drive a Tractor Semitrailer Combination Loaded on Improved (Primary) Roads	Driving Route	551-721-3337
1230-1600	Drive a Tractor Semitrailer Combination Loaded on Improved (Primary) Roads	Driving Route	551-721-3337
1600-1630	Perform After-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
DAY 10			
0730-0800	Perform Before-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
0800-1130	Drive a Tractor Semitrailer Combination Loaded on Improved (Primary) Roads	Driving Route	551-721-3337

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<u>WHEN</u>	<u>WHAT</u>	<u>WHERE</u>	<u>TASK NUMBER</u>
1230-1600	Drive a Tractor Semitrailer Combination Loaded on Improved (Primary) Roads	Driving Route	551-721-3337
1600-1630	Perform After-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
DAY 11			
0730-0800	Perform Before-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
0800-1130	Drive a Tractor Semitrailer Combination Loaded on Improved (Primary) Roads	Driving Route	551-721-3337
1230-1600	Drive a Tractor Semitrailer Combination Loaded on Improved (Primary) Roads	Driving Route	551-721-3337
1600-1630	Perform After-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
DAY 12			
0730-0800	Perform Before-Operation PMCS	Motor Pool	551-721-1352 551-721-1353
0800-1130	Unload Equipment From a Semitrailer	Training Area	551-721-3346
1230-1630	Perform PMCS on Vehicle and Semitrailer	Motor Pool	551-721-1352 551-721-135
DAY 13			
0730-1130	End of Course Comprehensive Test	Classroom/Motor Pool/ Training Area/Test Route	All Tasks
1230-1430	End of Course Comprehensive Test	Classroom/Motor Pool/ Training Area/Test Route	All Tasks
1430-1630	Perform PMCS on Vehicle and Semitrailer	Motor Pool	551-721-1352 551-721-1353

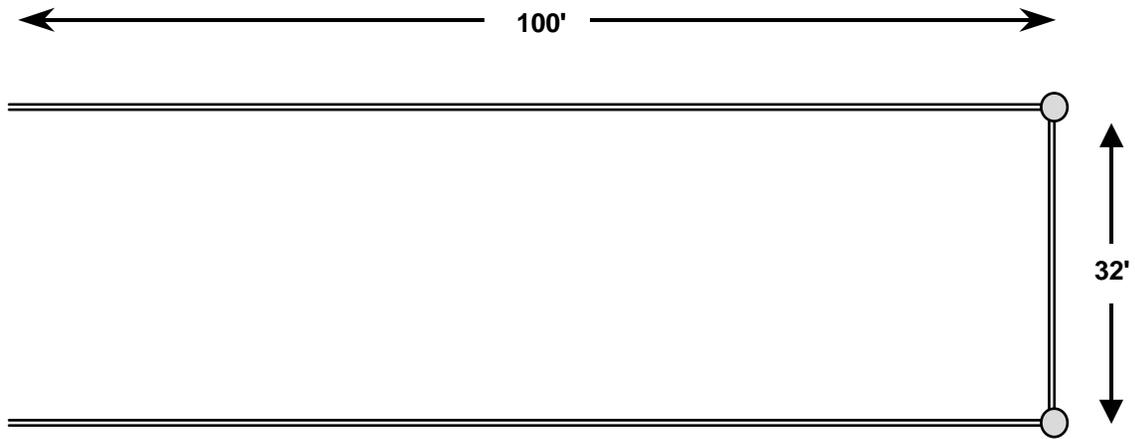
CHAPTER 4

SAMPLE TRAINING AREAS

This chapter shows the sample training areas for equipment transporters. The figures in this chapter depict equipment transporters as follows:

- Figure 4-1. Coupling/Uncoupling Area.
- Figure 4-2. Serpentine Course.
- Figure 4-3. Offset Alley.
- Figure 4-4. Straight Line Backing.
- Figure 4-5. Loading/Unloading Area.

THESE ARE THE MINIMUM SAFE DISTANCES.



**POL DRUMS, TRAFFIC CONES, OR BARRICADES
MAY BE USED FOR SIDE AND REAR BOUNDARIES.**

Figure 4-1. Coupling/Uncoupling Area.

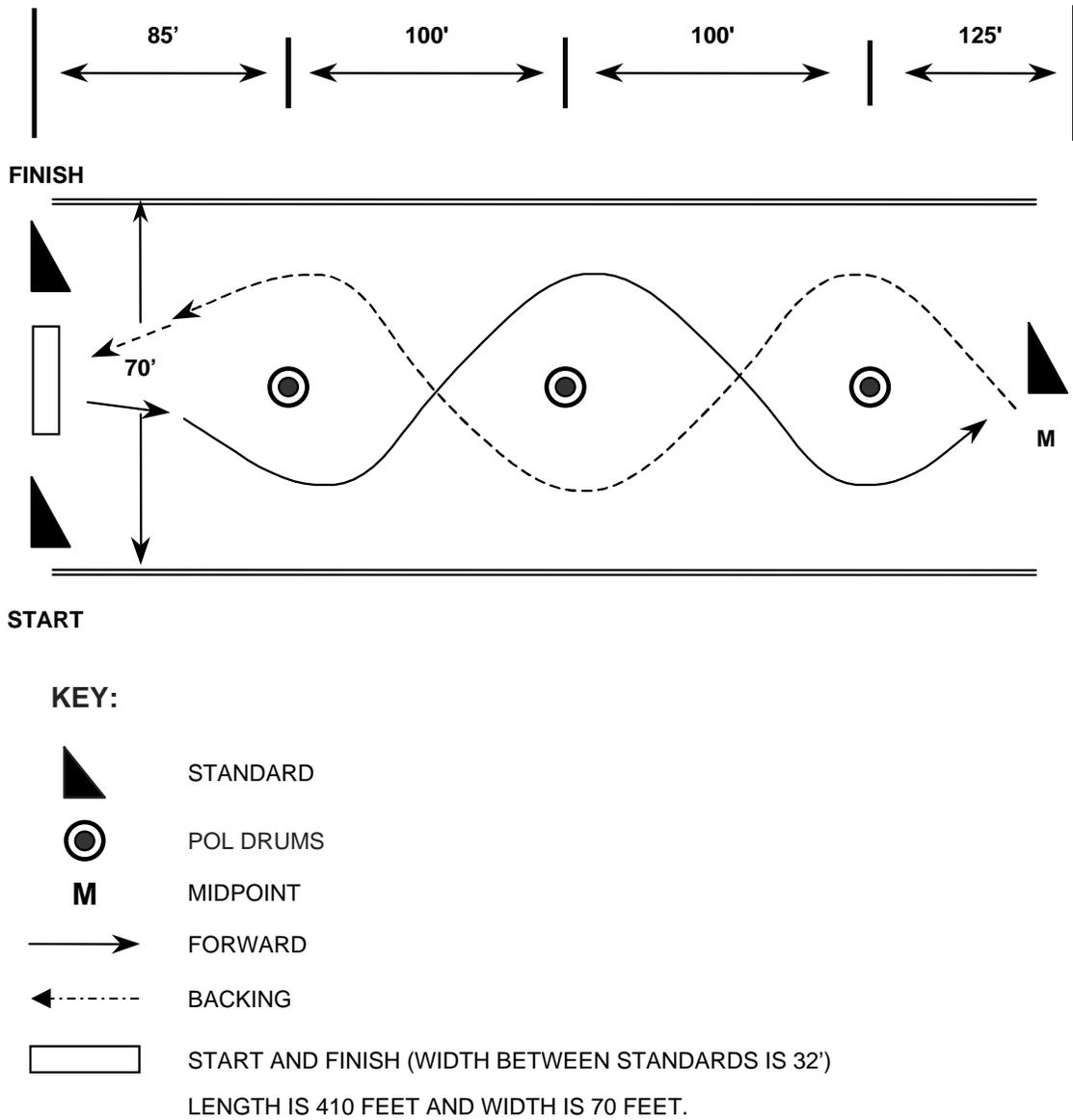
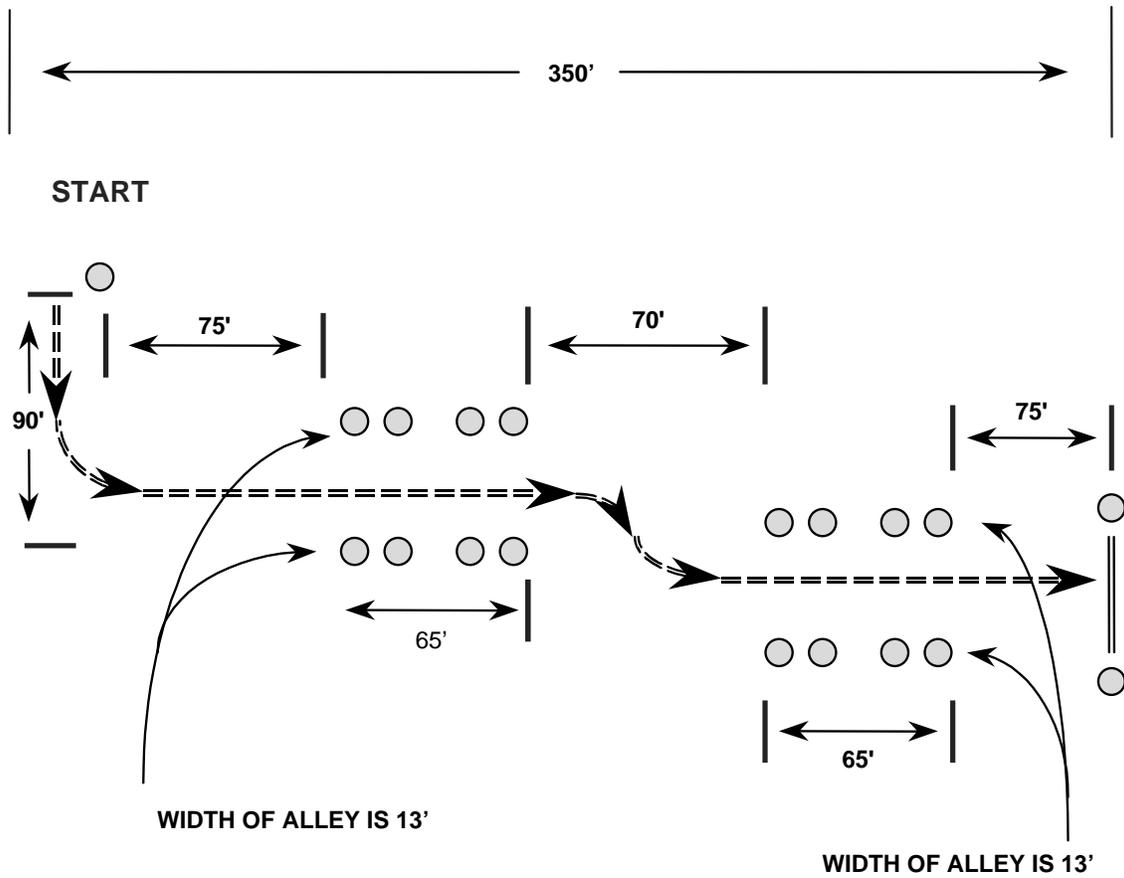


Figure 4-2. Serpentine Course.



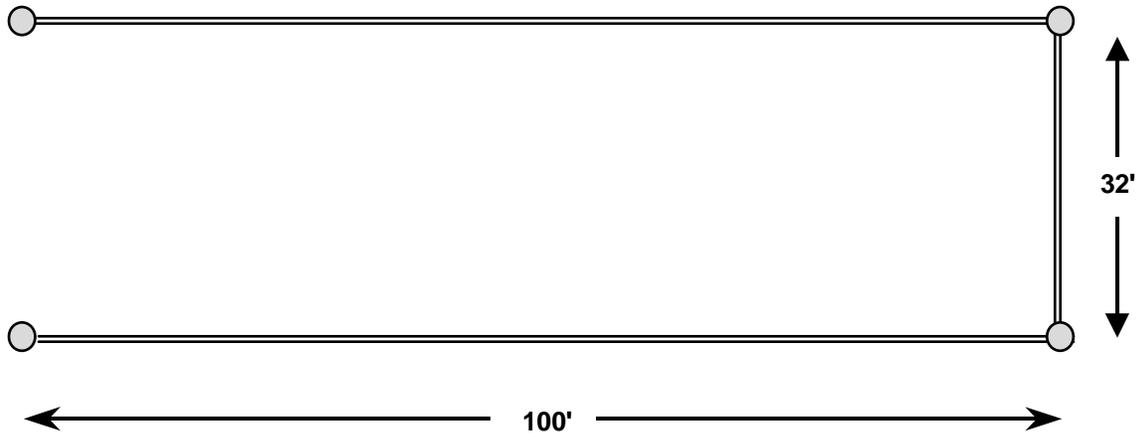
KEY:

TRAFFIC CONES = ○

STOP LINE = ==

FORWARD = ==>

Figure 4-3. Offset Alley.

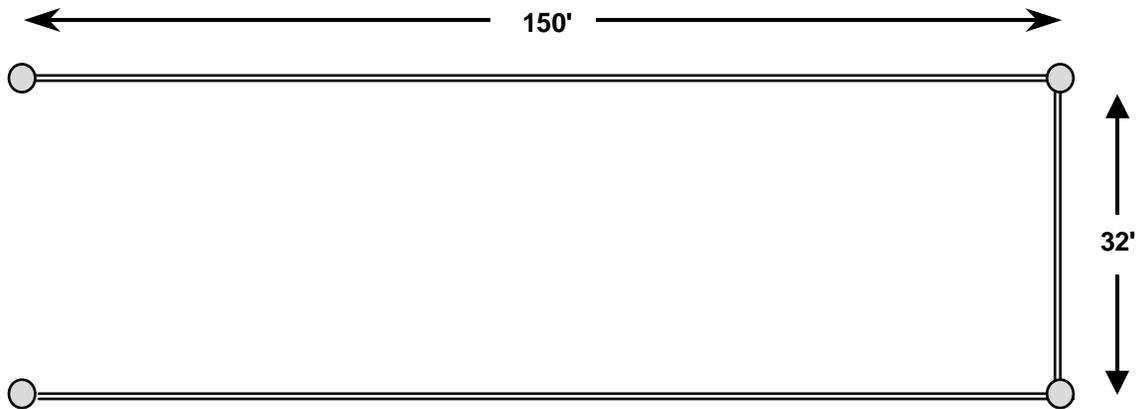


**POL DRUMS, TRAFFIC CONES, OR BARRICADES
MAY BE USED FOR SIDE AND REAR BOUNDARIES.**

**THE BACKING AREA IS 100 FEET IN LENGTH.
50 FEET IS THE SCORED GRADING AREA.
THE OTHER 50 FEET IS FOR GETTING THE VEHICLE
IN POSITION.**

Figure 4-4. Straight Line Backing.

THESE ARE THE MINIMUM SAFE DISTANCES.



**POL DRUMS, TRAFFIC CONES, OR BARRICADES
MAY BE USED FOR SIDE AND REAR BOUNDARIES.**

Figure 4-5. Loading/Unloading Area.

CHAPTER 5**HEAVY-EQUIPMENT TRANSPORTER M911****PURPOSE**

The material in this chapter provides uniform training for the operator of the M911 tractor and the M747 semitrailer

OBJECTIVE

The objective of this training is to provide a course that will qualify individuals destined to become heavy-equipment transport operators to safely operate and care for the vehicles.

TRAINING

Section I contains lessons compiled to assist instructors in scheduling and presenting the prescribed instruction. The number of students to be trained during one session is limited only by the number of instructors and vehicles available for training.

TESTING

Section II contains the performance tests and written examinations that must be used to qualify an individual on this vehicle. Students that do not pass the end of course comprehensive test (EOCCT) must be given additional training and testing. Students will be issued an operator's permit (OF 346 or SF 46) only after passing the EOCCT.

Section I

Lesson Outlines

LESSON TITLE: USE TECHNICAL MANUALS (TMs) AND LUBRICATION ORDERS (LOs) AND MAKE ENTRIES ON DA FORM 2404

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

A. TRAINING OBJECTIVE.

TASK: Use the vehicle operator's technical manual (TM), lubrication order (LO), semitrailer operator's TM, and make operator entries on DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

CONDITION In a classroom environment, given instruction, DA Form 2404, a practical exercise, TM 9-2320-270-10, LO 9-2320-270-12, and TM 9-2330-294-14.

STANDARDS: Locate information in the TM/LO and make the required operator entries on DA Form 2404 in the correct sequence according to DA Pamphlet 738-750. Each student has 30 minutes to complete the practical exercise without error and will be graded on a Go/No-Go basis.

B. INTERMEDIATE TRAINING.

Intermediate Training Objective 1

TASK: Use the vehicle operator's TM and LO.

CONDITION: In a classroom environment, given instruction, a practical exercise, TM 9-2320-270-10, and LO 9-2320-270-12.

STANDARDS: Answer the questions in the practical exercise by locating information in the TM/LO. Each student will be graded on a Go/No-Go basis.

Intermediate Training Objective 2

TASK: Use the semitrailer operator's TM.

CONDITION: In a classroom environment, given instruction, a practical

exercise, and TM 9-2330-294-14.

STANDARDS: Answer the questions in the practical exercise by locating information in the TM. Each student will be graded on a Go/No-Go basis.

Intermediate Training Objective 3

TASK: Document a no-fault situation on DA Form 2404.

CONDITION: In a classroom environment, given instruction, a DA Form 2404, a practical exercise, TM 9-2320-270-10, and TM 9-2330-294-14.

STANDARDS: You must fill out a no-fault situation on DA Form 2404 in the correct sequence according to DA Pamphlet 738-750. Each student will be graded on a Go/No-Go basis.

Intermediate Training Objective 4

TASK: Document a fault situation on DA Form 2404.

CONDITION: In a classroom environment, given instruction, a DA Form 2404, a practical exercise, TM 9-2320-270-10, and TM 9-2330-294-14.

STANDARDS: You must fill out a fault situation on DA Form 2404 in the correct sequence according to DA Pamphlet 738-750. Each student will be graded on a Go/No-Go basis.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom as scheduled.
3. Training type: Conference and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one assistant instructor for every 20 students for the practical exercise.
6. Training aids and equipment: Overhead projector, screen, transparency, DA Form 2404 (4 per student), a practical exercise situation sheet (1 per student), TM 9-2320-270-10, LO 9-2320-270-12, and TM 9-2330-294-14 (one set of references per student).

7. References: DA Pamphlet 738-750, LO 9-2320-270-12, TM 9-2320-270-10, and TM 9-2330-294-14.

D. SEQUENCE OF ACTIVITY.

NOTE: Before class arrival, ensure that each student desk or table has four DA Forms 2404 and one each per student of the operator's manuals and LOs.

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. Proper technique for using the vehicle operator's TM.
 - (1) Front cover, table of contents, and tabbed index.
 - (2) Cautions and warnings.
 - (3) PMCS tables.
 - (4) Alphabetical index.
- b. Use of the vehicle LO.
 - (1) Tables and notes.
 - (2) Level of maintenance codes.
 - (3) Lubrication after fording and high-pressure washing.
 - (4) Lubricant abbreviations and intervals.

c. Use of the semitrailer operator's TM.

- (1) Table of contents.
- (2) PMCS tables.
- (3) Lubrication chart.
- (4) Alphabetical index.

d. DA Form 2404 no-fault situation:

NOTE: Explain to the students that separate DA Forms 2404 must be maintained, one for the tractor and one for the semitrailer.

- (1) Organization.
- (2) Nomenclature and model.
- (3) Registration/serial number/NSN.
- (4) Type of inspection (PMCS).
- (5) TM number and TM date.
- (6) Date of inspection (column c).
- (7) Type of inspection (entered in column d when used for concurrent inspections).
- (8) Disposition of DA Form 2404.

e. DA Form 2404 fault situation:

NOTE: Explain to the students that when a DA Form 2404 has previous no-fault daily annotations, a new form does not have to be initiated when a fault must be annotated. Tell them to use the same form and that some of the steps listed below would already be completed.

- (1) Organization.
- (2) Nomenclature and model.
- (3) Registration/serial number/NSN.
- (4) Miles.

- (5) Hours.
- (6) Date.
- (7) Type of inspection (PMCS).
- (8) TM number and TM date.
- (9) Signature and rank in block 8a.
- (10) TM item number entered in column a. Circle item number if fault makes equipment not mission capable (NMC).
- (11) Status symbol entered in column b.
- (12) Deficiencies or shortcomings entered in column c.
- (13) Disposition of DA Form 2404.

3. Practical exercise: Hand out one practical exercise and four DA Forms 2404 to each student. Students will complete the practical exercise as outlined in paragraph 2 above within 30 minutes.

4. Evaluate: Check each student's practical exercise.

5. Summary:

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

6. Retraining: Retrain and retest No-Gos. No-Gos will be retrained and retested after normal duty hours.

E. SAFETY RESTRICTIONS. None.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 1.5 hours (1.0 conference and .5 practical exercise).

PRACTICAL EXERCISE

LESSON TITLE: USE TECHNICAL MANUALS AND LUBRICATION ORDERS AND MAKE ENTRIES ON DA FORM 2404

NAME _____ RANK _____ DATE _____

To complete this practical exercise you will need the vehicle operator's TM, LO, semitrailer operator's TM, four blank DA Forms 2404, and a pencil. You have 30 minutes to complete this practical exercise.

FIRST REQUIREMENT

Using the vehicle operator's TM, LO, semitrailer operator's TM, answer the following questions by writing your answer in the space provided after each question.

1. At what interval does the operator check the transmission for proper operation?
2. Where would you find the definition for the different classes of leaks?
3. In what section of the operator's TM would you find the basic issue items (BII) authorized for the tractor?
4. In what paragraph of the operator's TM would you find instructions for correct braking procedures?
5. What type of gear oil is used for the transfer case?
6. In what publication did you find the answer to question 5 above?

7. At what maintenance interval do you drain the semitrailer air tanks?
8. At what maintenance interval(s) do you check the semitrailer brakes?

SECOND REQUIREMENT

From the following information, make the required operator entries on DA Form 2404.

You are assigned to the 223d Mess Kit Repair Company as the operator of an M911 vehicle with registration number 2IF7HOOO and an M747 semitrailer with a registration number 2XP24045.

- a. On 17 December 1990, you perform a daily PMCS and find no faults on the tractor or semitrailer.
- b. On 18 December 1990, you perform a daily PMCS and again find no faults on either the tractor or semitrailer.
- c. On 19 December 1990, you perform a daily PMCS and your vehicle battery gauge is registering 34 vdc on the tractor. Your odometer reading is 2845 miles.
- d. On 20 December 1990, you perform a daily PMCS and you find your battery gauge has been repaired. No other faults are discovered on the tractor. The semitrailer lights are not operating. Make the appropriate entries.
- e. On 21 December 1990, you perform a weekly PMCS and find no faults.

LESSON TITLE: OBSERVE SAFETY RULES AND PROCEDURES FOR DRIVING UNDER ADVERSE ROAD CONDITIONS

TASK NUMBER: 551-721-1369 (Drive vehicle with semitrailer on snow/ice) and 551-721-1370 (Drive vehicle with semitrailer in sand).

A. TRAINING OBJECTIVE.

TASK: Demonstrate knowledge of procedures for driving under adverse conditions (snow, ice, mud, and sand).

CONDITION: Given instruction, a classroom, and a practical exercise.

STANDARDS: Answer 6 of 9 questions correctly on the practical exercise within 15 minutes.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom as scheduled.
3. Training type: Conference and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one assistant instructor for every 20 students for the practical exercise.
6. Training aids and equipment: Overhead projector, screen, transparency, and a practical exercise (1 per student).
7. References: TM 9-2320-270-10 and LO 9-2320-270-12.

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: The primary mission of the M911 (C-HET) is to evacuate disabled track/wheeled vehicles from maintenance collection points (MCPs) that are located close to main supply routes (MSRs). The M911 (C-HET) is not designed for off-road operations and should not be driven off road unless in an emergency situation. The following procedures are to be used in limited situations:

a. Driving in sand.

CAUTION

Shifting the auxiliary transmission while the M911 is moving may cause damage to the transmission and/or drive train.

CAUTION

Do not lock differentials while the vehicle is moving. Damage to the drive train may result.

CAUTION

Exercise caution when stuck or when loss of traction is experienced to prevent bouncing. If bouncing is experienced let up on the throttle until bouncing stops and then gradually increase engine rpm to move the vehicle.

- (1) Shift the auxiliary transmission to LOW RANGE to increase pulling power.
- (2) Set the transmission range selector to "1."
- (3) Raise the pusher axles during off road operations.
- (4) Move the INTER-AXLE DIFFERENTIAL and the TRANSFER CASE LOCK/UNLOCK control lever to the LOCK position. All driving axles will receive full torque. Return the control lever to the unlock position when the driving conditions are back to normal.

- (5) Adjust the tire pressure but not so much that tires slip on rims. Inflate the tires to normal pressure when the conditions improve.
- (6) Make sure all tire valve stems have a cap.
- (7) Keep steady even movement with both transmissions in low range. Keep the truck rolling without straining the engine and power train.
- (8) Steer the vehicle straight up and down hills if possible.
- (9) Do not straddle sand mounds or drive on the sides of two sand mounds. Loose sand will not support the vehicle on steep slopes.
- (10) Keep the accelerator pedal steady after the vehicle reaches the desired speed.
- (11) Turn the vehicle slowly when on loose sand.
- (12) To move the vehicle forward and turn after the vehicle is stopped in loose sand, do the following:
 - (a) Shovel a path ahead of each tire.
 - (b) Place boards, brush, channels, canvas, or similar material under and in front of drive tires.
 - (c) If the vehicle cannot be freed under its own power, use the winch if possible or have it towed out.
- (13) Check the water temperature gauge, transmission oil temperature gauge, and oil pressure gauge more often.
- (14) If the truck overheats, stop and find out why. Service, or if necessary, notify organization maintenance.
- (15) Clean sand and dirt from the engine and transmission oil dipstick tubes before removing to check oil levels. Clean around oil filler cap before adding oil.
- (16) Clean, inspect, and lubricate moving parts more often than in usual conditions (see LO 9-2320-270-12).
- (17) Clean the fuel container spout and areas around the fuel tank filler cap before adding fuel. In very sandy and dusty areas, filter or strain the fuel when filling the fuel tanks.

(18) When parking overnight or for extended periods, park with the rear of the truck toward the wind if possible, or cover the radiator and window glass with tarpaulin if available.

b. Driving in mud and snow, and on ice and slippery surfaces.

(1) Start moving by accelerating slowly with the auxiliary transmission in high range and the main transmission in D position. This will help avoid spinning tires.

(2) Drive at a slower speed.

(3) Signal what you plan to do sooner than in normal driving.

(4) Pump the brakes to help avoid skidding and give early warning that you are going to stop.

(5) Keep a greater distance between your vehicle and the vehicle ahead.

(6) Keep the windshield, windows, mirrors, headlights, stoplights, and main body lights clean and clear of mud, snow, and ice.

(7) Go down medium grades in a gear range normally used to climb the same grade. On steep or very slippery grades, use at least one gear range lower. The hydraulic retarder is used only on downgrades and curves and has the greatest effect in the lowest transmission gear ranges. (Do not use the hydraulic retarder for long periods of time). If the towing vehicles' wheels do not have good traction, do not use the retarder system. See the information sheet on using the retarder system at the end of this lesson.

(8) After driving through slush or water, drive slowly and put enough pressure on the service brake pedal to cause a slight drag. When heat from the dragging brakes has dried them, release the brake pedal and go back to normal driving.

(9) Stop and inspect a difficult section of road before driving on it. Select the transmission gear best suited for the road and then continue.

(10) If the tires start spinning and forward motion stops, back up and try again. It may be necessary to rock the vehicle by shifting to D range, accelerating lightly, and shifting to reverse (R) again when forward motion stops, and then back to D range. (Do not shift to reverse and back to drive while vehicle is in motion.) Try not to spin the tires.

(11) If the rear of the vehicle skids, do the following:

- (a) Let up on the accelerator pedal.
 - (b) Steer in the same direction in which the rear of the vehicle is skidding.
 - (c) When the vehicle is under control, press the brake pedal lightly.
 - (d) Steer the vehicle on a straight course and slowly press the accelerator pedal.
- (12) If the vehicle starts to slide while climbing a hill, do the following:
- (a) Let up on the accelerator pedal.
 - (b) Steer the vehicle in the direction of slide until the vehicle stops.
 - (c) Slowly press the accelerator pedal and steer the vehicle on a straight course.
- (13) Stopping on snow and ice.
- (a) Ease up on the accelerator and leave the transmission in gear.
 - (b) Apply the service brakes lightly and release; apply and release. Keep the engine rpm's between 1400 and 1850 by downshifting the transmission as the vehicle slows. This will allow the engine to assist in braking. Use the trailer brakes to assist the vehicle to slow down, stop, and prevent jackknifing.
 - (c) Do not brake suddenly on slick roads. This may cause the vehicle to skid.
 - (d) If the towing vehicles' wheels do not have good traction do not use the retarder system. See the information sheet at the end of this lesson for detail instructions on using the retarder system.
- (14) Parking in snow and on ice.
- (a) Park the vehicle in a sheltered area out of the wind if possible. If no shelter is available, park so the vehicle does not face into the wind.
 - (b) Place boards, brush, or other material that will give traction under the tires. This will guard against tires freezing to the ground

or becoming pocketed in ice and will give traction when the vehicle is moved again.

(c) Chock the tires and place the transmission in neutral. Do not apply the parking brake. The brake shoes may freeze in the applied position.

(d) Clean snow, ice, and mud off the vehicle as soon as possible.

3. Practical exercise: Hand out one practical exercise to each student. Students will complete practical exercise within 15 minutes.

4. Evaluate: Check each student's practical exercise.

5. Summary:

a. Recap main points.

b. Allow for questions.

c. Clarify questions.

d. Give closing statement.

6. Retraining: Retrain and retest No-Gos. No-Gos will be retrained and retested after normal duty hours.

E. SAFETY RESTRICTIONS. None.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 1 hour (.5 conference and .5 practical exercise).

TRANSMISSION (HYDRAULIC) RETARDER INFORMATION SHEET

1. The M911 commercial heavy-equipment transporter (C-HET) is equipped with a hydraulic transmission retarder that helps slow the C-HET on downgrades and curves. It has the greatest effect in the lower forward gear ranges. Push down on the hydraulic retarder pedal with your foot to apply. Do not hold for long periods. Make sure that the throttle is closed when using the retarder.

- a. To apply the retarder, release the accelerator and then depress the retarder pedal located to the left of the service brake pedal.
- b. To prevent overheating the transmission oil, fully release retarder pedal for short periods and reapply as necessary.

CAUTION

Avoid unnecessary use of the retarder. Use this pedal only to help slow your truck on curves and downgrades. Do not rest your foot on this pedal during normal driving. Long continuous use of the retarder pedal will raise the transmission fluid temperature to and beyond the safe limit and will cause damage to the transmission.

2. The instructors must *emphasis and reemphasize* the importance of the proper downhill braking procedures and the use of the engine retarder especially on slippery surfaces as outlined above. Instructors must instill in the drivers that if they do not follow these procedures, death or serious injury can result.

3. Also the instructors must explain to the students that the braking procedures are totally different when loaded and that the driver must think and plan ahead. The driver must increase his following distance and reduce his speed consistent with road and traffic conditions.

PRACTICAL EXERCISE

LESSON TITLE: OBSERVE SAFETY RULES AND PROCEDURES FOR DRIVING UNDER ADVERSE ROAD CONDITIONS

NAME	RANK	DATE
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To complete this practical exercise, you will need a pen or pencil. You have 15 minutes to complete this practical exercise and will be graded on a Go/No-Go basis.

SECTION I. True/false questions: Read each question carefully and place a T or F on the blank line to the left of each question.

- _____ 1. When operating a C-HET in sand, you should keep the accelerator pedal steady after vehicle reaches the desired speed.
- _____ 2. The INTER-AXLE DIFFERENTIAL LOCK can be shifted to the lock position while the vehicle is moving without causing any damage to the vehicle.
- _____ 3. Apply the brakes intermittently and lightly, using the engine to full advantage for braking effect in snow or on ice.
- _____ 4. When descending a steep or very slippery grade in a C-HET, you should use at least one gear range lower than normal.

SECTION II. Multiple choice: Read each question carefully and write the answer which is most correct on the blank line to the left.

- _____ 5. Which of the following procedures are recommending for driving in snow and on ice?
 - a. Accelerate slowly.
 - b. Drive at slower speeds.
 - c. Give signals sooner.
 - d. All the above.
- _____ 6. 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.

- _____ 7. When parking your vehicle in extreme cold or a desert environment, in what direction should the vehicle be parked?
- a. Face into the wind.
 - b. Sideways.
 - c. Face away from the wind.
 - d. No specific way.
- _____ 8. To keep the wheels from spinning when placing the vehicle in motion in snow or on ice, you should accelerate--
- a. Quickly.
 - b. Any way you want.
 - c. Slowly
 - d. None of the above.
- _____ 9. If your vehicle starts to skid, you should--
- a. Step on the brake pedal and hold the steering wheel straight.
 - b. Do nothing.
 - c. Release the accelerator pedal and steer in the direction of the skid.
 - d. Release the accelerator pedal and steer in the opposite direction of the skid.

LESSON TITLE: IDENTIFY INSTRUMENTS, CONTROLS, AND INDICATORS

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

A. TRAINING OBJECTIVE.

TASK: Know instruments, controls, and indicators.

CONDITION: Given instruction on the M911 C-HET.

STANDARDS: Correctly identify and explain the function of the instruments, controls, and indicators.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom and motor pool as scheduled.
3. Training type: Conference.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One primary instructor and one assistant instructor for every three students.
6. Training aids and equipment: One M911 for every three students. If the class is large, a PA system may be needed for the primary instructor.
7. References: TM 9-2320-270-10.

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.

NOTE: At this time, separate the class into groups of three and assign each group to a vehicle. Ensure that each group has an assistant instructor. The assistant instructor will identify and demonstrate the use of each item to his group of students as the instructor explains each item.

2. Explanation and Demonstration:

a. Gauges/controls and their functions and locations. The list of gauges/controls outlined below is only a partial list and are the most important on the M911.

- (1) The low oil pressure/high water temperature warning light is located at the top left of the instrument panel.
- (2) The left turn signal indicator flashes green when the left turn signal is on and is located just below the oil/water light.
- (3) The parking brake control is the knob located at the bottom of the instrument panel and is pulled out to apply the parking brakes, pushed in to release parking brakes and to charge the trailer air system.
- (4) The engine water temperature gauge is located below and to the right of the oil/water light and registers the engine coolant temperature in degrees Fahrenheit and Centigrade (normal range is 160°F-185°F (71°C to 85°C)).
- (5) The engine oil pressure gauge is below and to the left of the water temperature gauge and registers the engine oil pressure in pounds per square inch (psi) and in kilopascals (kPa). Normal range at 1800-2100 rpm is 50-70 psi (345-483 kPa).
- (6) The battery indicator is below and to the right of the water temperature gauge and indicates the battery rate of charge or discharge in volts. Normal reading is 20-30 vdc, the maximum is +31 vdc.
- (7) The tachograph registers truck speed (rpm and km/h hand), engine speed (rpm hand), and the distance traveled (odometer). The other two hands are clock hands. Do not operate the tachograph without a disc.

(8) The PTO/auxiliary throttle indicator is located below the tachograph. The red light indicates when the power takeoff unit is engaged or if the throttle release safety switch at the winch control panel has been accidentally left on.

(9) The PTO control is located to the right of the PTO/auxiliary throttle indicator. With the throttle release safety off, move the lever to the ENGAGE position to engage the power takeoff unit. Move the lever to the DISENGAGE position to disengage the power takeoff unit. When the PTO has disengaged, the indicator will go off.

(10) The trailer air supply control supplies air to the trailer air reservoirs. Push in to supply air to (charge) the trailer reservoirs; pull out to shut off air to the trailer. If the tractor air system pressure drops to 65 psi (35.9 kPa), the trailer air supply valve will trip, fully applying the trailer spring brakes. It is located below the parking brake control.

(11) The pusher axle air pressure load control adjusts air pressure load on the pusher axle in order to meet local highway regulations regarding maximum loads per axle. Move this lever to the inflate position to increase air load on the pusher axle. Return the lever to the deflate position to relieve air load on pusher axle. It is located above the pusher axle air pressure load gauge.

(12) Located below the pusher axle air pressure load control is the pusher axle air pressure load gauge. It indicates the air pressure load (in psi) on the pusher axle. With full air pressure load on the pusher axle, this gauge should register approximately 110 psi (755 kPa).

(13) The pusher axle raise/lower control located to the left of the pusher axle air pressure load gauge is used to activate the air suspension to lower or raise the pusher axle. To lower the pusher axle, rotate the knob counterclockwise to the down position. To raise the pusher axle, rotate the knob clockwise to the up position.

(14) The headlight high beam indicator located to the right and above the tachograph shows red when the headlights are on high beam.

(15) The air pressure gauge registers air pressure (in psi and kPa) in both sections of the dual system. The green needle shows the front axle system air pressure. The red needle shows the rear axle system air pressure. Normal reading is 100 to 125 psi (690 to 862 kPa).

(16) Located to the left and below the air pressure gauge is the main transmission oil temperature gauge. It registers the main transmission

fluid temperature (in F and C). Normal operating range is 160°F-220°F (71°C-104°C).

(17) The fuel level gauge is located to the left of the main transmission oil temperature gauge and registers the level of fuel in the right fuel tank.

(18) Located above and to the right of the air pressure gauge is the low air pressure warning light. The red warning light will remain on and the buzzer will sound until the air system pressure in each section of the dual system exceeds 60 psi (414 kPa).

(19) The instrument panel rheostat (LPS) is located below and to the right of the low air pressure warning light. When the service light switch is on, rotate this knob clockwise to turn on the instrument panel lights; keep turning the knob clockwise to dim panel lights. Rotate the knob fully counterclockwise to turn off the panel lights.

(20) The right turn signal indicator is located slightly to the right and below the low air pressure warning light and flashes green when the right turn signal is on.

(21) The service light switch is located to the right of the LPS. It is the first toggle switch in the row of five and is pushed up to turn on the service lights; return to the center position to turn off the service lights.

(22) The next toggle switch in the row is the clearance lights (CL) switch LPS. It is pushed up to turn on the clearance lights; return to center position to turn off clearance lights.

(23) Next is the dome light switch. It is pushed up to turn on the dome light; return to center position to turn off the dome lights.

(24) The beacon (warning) light switch is next in line. Push it up to turn on the beacon warning light; return it to the center position to turn off the beacon warning light.

(25) The work lights switch is next in line and is pushed up to turn on the work lights and illuminate the winch station and the rear of the truck; return it to the center position to turn off the work lights.

(26) Next in line is the blackout lights switch. Pull it out and push it to the left to turn on the blackout lights; pull out and return it to the right to turn off the blackout lights.

(27) The wiper run-park (wiper controls) is located below the row of five toggle switches just discussed. The left control operates the left

windshield wiper and the right control operates the right wiper. Rotate the control counterclockwise to the RUN position to turn on the wiper. Rotate the control clockwise to turn off the wiper.

(28) The defroster control is located below the wiper controls. Pull out to open the defroster vents; push in to close vents.

(29) The heat temperature control is located to the left of the defroster control. Pull out to increase the heater output temperature; push in to decrease output temperature.

(30) The fan lo-off-high (heater fan speed switch) is located to the left of the heat temperature control. It controls the speed of the heater fan. Push to the left for low speed, center to turn off, or to the right for high speed.

(31) The key switch is located to the left of the fan switch. Rotate the key clockwise to turn this switch to the on position (low oil pressure/high water temperature warning light and buzzer should come on). To start engine, continue rotating the key further clockwise to the start position, while slightly depressing the accelerator pedal. (When the engine starts, low oil pressure/high water temperature warning light and buzzer should go off).

(32) To the left of the key switch is the engine stop switch. This switch stops the engine when the switch is held in the up position. Hold it in the up position until the engine completely stops. When the engine stops, release the switch; it will return to the center (off) position. Turn the key switch counterclockwise to the off position.

(33) The inter-axle differential and transfer case (differential lock/unlock control) is located below the tachograph and controls the inter-axle differential and transfer case differential. The center position is the normal operating position, allowing full differential action to all three axles. For maximum traction in off-highway conditions, stop the vehicle and then move the lever to the lock position to lock the driveline. When traction is back to normal, move the lever to the unlock position while the truck is moving. When the locking system disengages and differential lock indicator goes off, return the lever to the center position.

(34) To the right of the differential lock/unlock control is the differential lock indicator. The red light indicates when the differential lock/unlock control is in the lock position and the driveline locking system is engaged.

(35) There are eleven circuit breakers located to the right of the row of toggle switches on the dashboard. If a breaker trips, the numbered button will pop outward. Push in on the button to reset the circuit breaker. If the

breaker trips again, investigate the cause and notify organization maintenance, if necessary.

(36) Below and to the right of the circuit breakers is located the quick start control. When this handle is pulled out, ether is injected into the engine cylinders to aid in cold weather starting. Refer to the cold weather starting procedures in the operator's TM for the correct use.

(37) The main transmission range selector lever is located slightly forward and to the right of the driver's seat. Use it to select the proper transmission gear range for a particular driving condition. The following is the gear selection ranges in the main transmission:

(a) "R" Reverse is used for backing up. The M911 tractor must be completely stopped before shifting from a forward gear range to reverse or from reverse to a forward gear range.

(b) "N" Neutral is used for starting the engine and parking. If parking with the engine running, put the selector in neutral and apply the parking brake.

(c) "D" 2nd through 5th gear range is used for driving conditions and winch operations. The vehicle starts in 2nd and automatically upshifts through 3rd, 4th, and 5th gears as speed increases and automatically downshifts as speed decreases.

(d) 4 - 2nd through 4th gear range is used when needed to limit automatic shifting to a lower range because of road conditions. (Range 4, 3, 2, and 1 give increasingly greater engine braking and hydraulic retarder action. The lower the gear range, the greater the braking power and retarding effects.) When conditions go back to normal, select D.

(e) 3 - 2nd and 3rd gear range is used to restrict automatic shifting to the 2nd and 3rd gear range.

(f) 2 - 2nd gear is used for driving through snow, on ice, or for driving up steep grades. No automatic shifting will occur in this position (unless engine overspend occurs).

(g) 1 - 1st gear is used to get the greatest pulling power, engine braking, and hydraulic retarder effect.

(38) The auxiliary transmission lever is to the right of the main transmission lever. It shifts the auxiliary transmission into one of two ranges (low or high) or into neutral. Never shift the auxiliary transmission

while the truck is moving. Stop the truck, put the main transmission in neutral, let the engine idle, and then shift the auxiliary transmission to the range needed. Refer to the following instructions for correct use.

(a) The low range is used for severe load and grade conditions and for off-road operations. It helps the main transmission drive ranges give greater working power to the wheels.

(b) The neutral position is used to take the auxiliary transmission out of gear. It is also the position used for winching operations.

(c) The high range is used for all normal driving operations.

(39) The windshield washer valve is located on the floor above the headlight dimmer switch. Push down with your foot to activate windshield washer. Release foot pressure to turn off the water.

(40) The headlight dimmer switch is located on the floor to the left of the hydraulic retarder pedal and below the windshield washer switch. Push all the way down with your foot and release to switch headlights to high beam. Push all the way down and release again to dim headlights.

(41) The service brake pedal is between the hydraulic retarder pedal and the accelerator pedal. Push down with your foot to apply the service brakes. If your vehicle is properly coupled, the trailer service brakes will also be applied when you use your truck's service brake pedal.

(42) The accelerator pedal is to the right of the service brake pedal. Push down slowly with your foot to increase engine speed to start the truck moving.

(43) The hydraulic retarder pedal is to the left of the service brake pedal. Use it to help slow your truck on downgrades and curves. It has the greatest effect in the lowest transmission gear ranges. Push down with your foot to apply. Do not hold for long periods of time. Make sure that the throttle is closed when you use the retarder.

(44) The emergency flasher control is mounted on the left side of the steering column. Pull out to turn on the emergency flashers. Push the turn signal lever up or down and return it to the center to turn off the emergency flashers.

(45) The turn signal lever is part of the emergency flashers. Push up to turn on the right turn signals. Pull down to turn on the left turn signals. Return to the center position when the turn has been completed.

(46) The horn button is located in the center of the steering wheel. Push on the button to sound the horn. The M911 is also equipped with an air horn located overhead to the driver's left front. To sound the horn, pull down on the chain.

(47) The trailer hand brake control is opposite the turn signals control. Pull down to apply trailer brakes only. (Should only be used to test the semitrailer brakes. Using it when driving will cause the semitrailer to skid.) To park, use the parking brake or chock the wheels. Using the semitrailer hand control to park can cause all the air to leak out. Be sure to return the control to its off position (all the way up).

5. Summary:

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

E. SAFETY RESTRICTIONS. None.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 1.5 hour conference.

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 M911 (C-HET).

CONDITION: Given instruction, a DA Form 2404, a pencil, TM 9-2320-270-10, equipment records folder, rags, lubricants, coolant, and a C-HET with BII.

STANDARDS: Inspect the vehicle according to the PMCS tables listed in TM 9-2320-270-10, correct all faults within the operator's level of maintenance, and legibly record all others on DA Form 2404. If no faults are found, make necessary entries on DA Form 2404.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom and motor pool as scheduled.
3. Training type: Conference, demonstration, and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every three students for the demonstration and practical exercise.
6. Training aids and equipment: Television, videocassette recorder, TVT 55-19 "Equipment Transporter PMCS," hearing protection, rags, lubricants, and coolant. DA Form 2404, pencil, TM 9 2320-270-10, equipment records folder, and an M911 with BII for every three students.
7. References: TM 9-2320-270-10 and DA Pamphlet 738-750.

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 tape TVT 55-19 "Equipment Transporter PMCS."
 - b. Demonstrate before-, during-, and after-operation PMCS.
3. Practical exercise:
- a. Assign students to vehicles and issue TM 9-2320-270-10, pencils, DA Form 2404, and equipment records folder. Instruct students on the location of rags, lubricants, and coolant.
 - 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. Give closing statement.
6. Retraining: Retrain No-Gos and slow learners. Students perform PMCS daily and are tested on the EOCCT.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when vehicles are parked.

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2. Always place transmission in neutral, set parking brake, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that all personnel wear hearing protection when the engine is running.
5. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
6. Ensure that personnel wear seat belts (if equipped) when vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 5 hours (.5 conference, .5 demonstration, and 4 practical exercise). The remaining PMCS is performed throughout the course in conjunction with driving tasks.

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

TASK NUMBER: 551-721-1353 (Perform preventive maintenance checks and services [PMCS] on trailers)

A. TRAINING OBJECTIVE.

TASK: Perform operator PMCS on the M747 semitrailer.

CONDITION: Given instruction, a DA Form 2404, a pencil, TM 9-2330-294-14, equipment records folder, rags, lubricants, coolant, and a C-HET coupled to an M747 semitrailer with BII.

STANDARDS: Inspect the semitrailer according to the PMCS tables listed in TM 9-2330-294-14, correct all faults within the operator's level of maintenance, and legibly record all others on DA Form 2404. If no faults are found, make necessary entries on DA Form 2404.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom and motor pool as scheduled.
3. Training type: Conference, demonstration, and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every two students for the practical exercise.
6. Training aids and equipment: Hearing protection, rags, lubricants, and coolant. DA Form 2404, pencil, TM 9-2330-294-14, equipment records folder, and a C-HET coupled to an M747 semitrailer with BII for every two students.
7. References: TM 9-2330-294-14 and DA Pamphlet 738-750.

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: Demonstrate before-, during-, and after-operation PMCS.
- 3. Practical exercise:
 - a. Assign students to vehicles with semitrailer and issue TM 9-2330-294-14, pencils, DA Form 2404, and equipment records folder. Instruct students on the location of rags, lubricants, coolant.
 - 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. Give closing statement.
- 6. Retraining: Retrain No-Gos and slow learners. Students perform PMCS daily and are tested on the EOCCT.

E. SAFETY RESTRICTIONS.

- 1. Ensure that all chock blocks are in place when vehicles are parked.
- 2. Always place transmission in neutral, set parking brake, and shut off the engine before leaving the vehicle.

3. Ensure that students remove all jewelry and identification tags before performing PMCS.

4. Ensure that all personnel wear hearing protection when engine is running.

5. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.

6. Ensure that personnel wear seat belts (if equipped) when vehicle is in motion.

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

LESSON TITLE: COUPLE SEMITRAILER

TASK NUMBER: 551-721-1314 (Couple semitrailer)

A. TRAINING OBJECTIVE.

TASK: Couple the M911 (C-HET) to an empty M747 semitrailer.

CONDITION: Given instruction, a suitable training area, an M911 C-HET, and an M747 semitrailer.

STANDARDS: Couple the tractor/semitrailer combination in the correct sequence without causing damage to equipment or injury to personnel.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training locations: Classroom and training area as scheduled.
3. Training type: Conference, demonstration, and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every three students for the demonstration and practical exercise.
6. Training aids and equipment: Television, videocassette recorder, and tape TVT 55-20 "Coupling and Uncoupling the Equipment Transporter." Hearing protection, an M911 C-HET and an M747 semitrailer with BII for every three students.
7. Reference: TM 9-2320-270-10.

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 tape TVT 55-20 "Coupling and Uncoupling the Equipment Transporter."
- b. Demonstrate coupling procedures.

(1) Preparing for coupling before backing under semitrailer:

- (a) Visually check the fifth wheel for cracked, damaged, or missing parts.
- (b) Check maintains for good condition and mounting bolts for tightness.
- (c) Check that all moving parts and top of fifth wheel are properly lubricated.
- (d) Pull the fifth wheel lock secondary lock handle all the way out and hook it in the out position.

NOTE: The fifth wheel lock primary lock handle can be in either the out or in position to latch.

- (e) Be sure that the fifth wheel ramps are down level with or slightly below the angle of the pickup ramps.
- (f) Ensure chock blocks are in place behind the semitrailer wheels.

(2) Backing toward semitrailer:

CAUTION

Do not permit anyone to stand directly between the tractor and semitrailer during the coupling procedure. Failure to follow this warning can result in injury to personnel.

CAUTION

Be careful not to run the kingpin up the fifth wheel ramps as this will damage the kingpin, the fifth wheel, or the payload.

NOTE: Ensure driver and ground guides understand proper hand and arm signals.

- (a) Align tractor straight in front of the semitrailer.
- (b) Prepare the semitrailer for coupling. Adjust the trailer height so that the fifth wheel picks up the trailer on the fifth wheel ramps.
- (c) Direct a crewmember (ground guide) to stand at the left rear of the tractor (never directly behind) to give coupling instructions.
- (d) Slowly back the tractor under the semitrailer gooseneck so that it slides up the approach ramps with the semitrailer kingpin centered as closely as possible in the throat of the fifth wheel.
- (e) Make sure you have picked up the semitrailer with the fifth wheel ramps. If the kingpin comes in too high, it will not engage in the fifth wheel correctly.
- (f) When you have correctly picked up the semitrailer on the fifth wheel ramps, stop backing.

NOTE: Stopping at this point helps to prevent hitting too hard in coupling.

(3) Coupling:

- (a) Connect air hoses (red emergency air hose glad hand to semitrailer emergency glad hand and blue service air hose glad hand to semitrailer service glad hand) and electrical cable; then push in the trailer supply control knob and set the trailer hand brake.
- (b) Back up slowly until the fifth wheel locks firmly to the kingpin. Release the parking brake and pull against the load with the hand brake set. This will apply pressure against the kingpin and provide a test to ensure a secure coupling.
- (c) Verify that the lock release handles are in.

NOTE: The kingpin must be in the locks. You should not be able to see daylight between the upper fifth wheel plate of the semitrailer and the fifth wheel.

(d) Be sure the kingpin is not locked over the front of the fifth wheel.

(e) Raise and secure the semitrailer landing gear.

(f) Apply the parking brake and stow chock blocks.

(g) Perform PMCS on the semitrailer (see semitrailer PMCS lesson outline in this TC).

(h) Be sure air pressure gauge shows at least 80 psi before putting the C-HET in motion.

3. Students perform PMCS.

4. Practical exercise: Students practice coupling the tractor/semitrailer in the coupling/uncoupling training area (see Chapter 4, Figure 4-1).

5. Evaluate: Check each student's coupling performance.

6. Summary:

a. Recap main teaching points.

b. Allow for questions.

c. Clarify questions.

d. Give closing statement.

7. Retraining: Retrain and retest No-Gos. No-Gos will be retrained after normal duty hours. Students are tested on the EOCCT.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when the vehicle is parked.

2. Always place the transmission in neutral, set parking brakes, and shut off the engine before leaving the vehicle.

3. Ensure that students remove all jewelry and identification tags before performing PMCS.

4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.

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5. Always use ground guides when backing.
6. Always wear hearing protection when working in or around a running C-HET.
7. Ensure that the driver and ground guides know and understand the hand and arm signals as outlined in FM 21-305.
8. Never back at a speed over 5 mph.
9. Ensure personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 3.5 hours (.5 conference, .5 demonstration, 2.5 practical exercise to include .5 before-operation PMCS).

LESSON TITLE: UNCOUPLE SEMITRAILER

TASK NUMBER: 551-721-1315 (Uncouple semitrailer)

A. TRAINING OBJECTIVE.

TASK: Uncouple the M911 (C-HET) from an empty M747 semitrailer.

CONDITION: Given instruction, a suitable training area, an M911, and an M747 semitrailer.

STANDARDS: Uncouple the tractor from the semitrailer in the correct sequence without causing damage to the equipment or injury to personnel.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training locations: Classroom and training area as scheduled.
3. Training type: Conference, demonstration, and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every three students for the practical exercise and demonstration.
6. Training aids and equipment: Television, videocassette recorder, and tape TVT 55-20, "Coupling and Uncoupling the Equipment Transporter." Hearing protection, an M911 C-HET, and an M747 semitrailer with BII for every three students.
7. Reference: TM 9-2320-270-10.

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 the film TVT 55-20 "Coupling and Uncoupling the Equipment Transporter."

b. Demonstrate uncoupling procedures.

- (1) Pull out the trailer air supply valve.
- (2) Apply the parking brakes to verify that the parking brake indicator light comes on. This will keep the tractor from running out from under the semitrailer when you unlock the fifth wheel.
- (3) Lower the semitrailer landing gear.
- (4) Ensure chock blocks are in place. (On level ground, place blocks on one side in front of the wheels and one side to the rear. Place blocks behind wheels on both sides on upgrades. Place blocks in front of both wheels on downgrades.)
- (5) Set the trailer hand brake. Disconnect and secure the trailer air hoses (to harness holder) and light cable (in stowage compartment).
- (6) Unlock the fifth wheel by pulling the secondary lock release handle out and raising it so that it hooks on the fifth wheel housing. Then pull the primary lock release handle out and hook it in the unlocked position the same way as the secondary lock handle.
- (7) Have a crewmember observe the semitrailer kingpin to make sure it clears properly during uncoupling.

CAUTION

Make sure kingpin clears rear frame cross members when you are pulling the tractor forward.

(8) Release the parking brake and slowly pull the tractor forward, allowing the semitrailer gooseneck and kingpin to slide down the fifth wheel and ramps until the semitrailer landing gear touches the ground.

3. Practical exercise: Students practice uncoupling the tractor/semitrailer in the coupling/uncoupling training area (see Chapter 4, Figure 4-1).
4. Evaluate: Check each student's uncoupling performance.
5. Students perform after-operation PMCS.
6. Summary:
 - a. Recap main teaching points.
 - b. Allow for questions.
 - c. Clarify questions.
 - d. Give closing statement.
7. Retraining: Retrain and retest No-Gos. No-Gos will be retrained after normal duty hours. Students are tested on the EOCCT.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when the vehicle is parked.
2. Always place the transmission in neutral, set parking brakes, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Ensure that ground guides are always used when backing.
6. Always wear hearing protection when working in or around a running C-HET.
7. Ensure that the driver and ground guide know and understand the hand and arm signals as outlined in FM 21-305.
8. Never back at a speed over 5 mph.

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9. Ensure personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 3 hours (.5 conference, .5 demonstration, and 2.0 practical exercise including .5 after-operation PMCS).

LESSON TITLE: DRIVE VEHICLE WITH AUTOMATIC TRANSMISSION

TASK NUMBER: 551-721-1364 (Drive vehicle with automatic transmission)

A. TRAINING OBJECTIVE.

TASK: Drive an M911 C-HET with an automatic transmission.

CONDITION: Given instruction, a DD Form 1970, DA Form 2404, pencil, TM 9-2320-270-10, equipment records folder, rags, lubricants, coolant, a suitable driver training area, an M911 C-HET (bobtail) with BII.

STANDARDS: Operate the automatic transmission on the M911 C-HET vehicle: use high and low range, upshift and downshift through all gears, and perform basic driving maneuvers to include correct backing using a ground guide.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom, motor pool, and driver training area as scheduled.
3. Training type: Conference, demonstration, and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every two students for the demonstration and practical exercise.
6. Training aids and equipment: Television, videocassette recorder, TVT 55-22 "Driving a Loaded Equipment Transporter," hearing protection, rags, lubricants, coolant, and 40 traffic cones, empty POL drums, or barricades, DA Form 2404, DD Form 1970, pencil, TM 9-2320-270-10, an M911 C-HET (bobtail) with BII for each two students.
7. References: TM 9-2320-270-10.

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 tape TVT 55-22 " Driving a Loaded Equipment Transporter."
- b. The main transmission range selector lever is located slightly forward and to the right of the driver's seat. It is used to select the proper transmission gear range for a particular driving condition. The following is the gear selection ranges of the main transmission:
 - (1) "R" Reverse is used for backing up. The M911 tractor must be completely stopped before shifting from a forward gear range to reverse or from reverse to a forward gear range.
 - (2) "N" Neutral is used for starting the engine and for parking. If you park with the engine running, put the selector in neutral and apply the parking brake.
 - (3) "D" 2nd through 5th gear range is used for driving conditions and winch operations. Vehicle starts in 2nd and automatically upshifts through 3rd, 4th, and 5th gears as speed increases. It automatically downshifts as speed decreases.
 - (4) 4 - 2d through 4th gear range is used when needed to limit automatic shifting to a lower range because of road conditions. Range 4, 3, 2, and 1 gives increasingly greater engine braking and hydraulic retarder action. The lower the gear range, the greater the braking power and retarding effects. When conditions go back to normal, select "D."
 - (5) 3 - 2d and 3rd gear range is used to restrict automatic shifting to the 2d and 3rd gear range.

(6) 2 - 2d gear is used for driving through ice and snow, or for driving up steep grades. No automatic shifting will occur in this position (unless engine overspeed occurs).

(7) 1 - 1st gear is used to get the greatest pulling power, engine braking, and hydraulic retarder effect.

c. The inter-axle differential and transfer case (differential lock/unlock control) is located below the tachograph and controls the inter-axle differential and transfer case differential. The center position is the normal operating position, allowing full differential action to all three axles. For maximum traction in off-highway conditions, stop the vehicle; then move the lever to the lock position to lock the driveline. When traction is back to normal, move the lever to the unlock position while the truck is moving. When the locking system disengages and the differential lock indicator goes off, return the lever to the center position.

d. To the right of the differential lock/unlock control is the differential lock indicator. The red light indicates when the differential lock/unlock control is in the lock position and the driveline locking system is engaged.

e. The service brake pedal is between the hydraulic retarder pedal and the accelerator pedal. Push down with your foot to apply the service brakes. If the vehicle is properly coupled, the trailer service brakes will also be applied when you use the truck's service brake pedal.

f. The accelerator pedal is to the right of the service brake pedal. Push down slowly with your foot to increase engine speed to start the truck moving.

g. The hydraulic retarder pedal is to the left of the service brake pedal. It is used to help slow your truck on downgrades and curves. It has the greatest effect in the lowest transmission gear ranges. Push down with your foot to apply. Do not hold for long periods of time. Make sure that throttle is closed when you use the retarder. (See the detailed information sheet on using the hydraulic retarder at the end of this lesson.)

h. The auxiliary transmission lever is to the right of the main transmission lever. It shifts the auxiliary transmission into one of two ranges (low or high) or into neutral. Never shift the auxiliary transmission while the truck is moving. Stop the truck, put the main transmission in neutral, let the engine idle, and then shift the auxiliary transmission to the range needed. Refer to the following instructions for correct use:

(1) The low range is used for severe load and grade conditions, and for off-road operations. It helps the main transmission drive ranges give greater working power to the wheels.

(2) The neutral position is used to take the auxiliary transmission out of gear. It is also the position used for winching operations.

(3) The high range is used for all normal-driving operations.

i. The trailer hand brake control is on the opposite side from the turn signals control. Pull down to apply the semitrailer brakes only. (Use only to test the semitrailer brakes. Using it when driving will cause the semitrailer wheels to skid.) To park, use the parking brake or chock the wheels. Using the semitrailer hand control to park can cause all the air to leak out. Be sure to return control to its off position (all the way up).

j. Explain ground guide safety precautions for backing the C-HET.

k. Demonstrate hand and arm signals required for this exercise.

l. Demonstrate driving through maneuver (see Chapter 4, Figures 4-2 and 4-3).

3. Practical exercise:

a. Assign students to vehicles and issue TM 9-2320-270-10, 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. Give safety briefing (see sample convoy/controller briefing at the end of this lesson).

d. Students practice maneuvering the M911 C-HET without a semitrailer through the course laid out in the training area (see Chapter 4, Figures 4-2, 4-3, and 4-4). During-operation PMCS is also conducted at this time.

NOTE: The success of this driver training program is the ability of the instructor to get in the cab of the truck with the student driver and pass on valuable experience and proper driving techniques. Now is the time to correct any bad driving habits.

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 the vehicle is parked.
2. Always place the transmission in neutral, set parking brake, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Ensure that ground guides are always used when backing the C-HET.
6. Maintain a safe following distance and speed limit when driving in the training area (as determined by the local command).
7. Always wear hearing protection when working in or around a running C-HET.
8. Do not shift the auxiliary transmission while the vehicle is moving.
9. Do not shift the transfer case (differential lock/ unlock control) lever to the lock position while the vehicle is moving.
10. Ensure that personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 4 hours (.5 conference, .5 demonstration, and 3.0 practical exercise including .5 PMCS).

SAMPLE ESCORT/CONTROLLER'S BRIEFING INFORMATION SHEET

1. Always follow civilian and military police instructions when given.
2. On controlled access highways, use truck parking areas only.
3. Make only emergency halts on the roadside of controlled-access highways.
4. Do not stand on the traffic side of a vehicle during halts on conventional highways.
5. Perform vehicle operation maintenance and check cargo security at every halt.
6. Move vehicles off the highway before beginning maintenance.
7. Have reflectors and warning devices in place before beginning maintenance.
8. Use warning lights during periods of darkness or reduced visibility.
9. Begin movement only at the escort/controller's signal.
10. Observe vehicle speed restrictions: _____ as determined by the local commander.
11. Observe vehicle intervals (minimums):
 - a. Controlled-access highway - 200 yards.
 - b. Rural conventional highway - 150 yards.
 - c. Urban conventional highway - 50 yards.
 - d. Blackout conditions - 60 to 180 feet.
12. Use the acceleration lane, when available, to reach highway speed.
13. Gradually attain proper vehicle interval once on the main route.
14. Operate all vehicles with headlights (except when under blackout conditions) on at all times.
15. Use warning devices correctly.
16. Remember the following: Because of the weight of the C-HET combination, roadways and curbs may give way, causing the vehicle to turn over. When approaching oncoming traffic on a narrow road--
 - a. Signal your intentions.
 - b. Move to the right of the roadway only as far as you safely can and stop.
 - c. Wait until the other vehicles have passed and resume travel on the most solid part of the road.
17. Add any additional comments as local conditions warrant.

TRANSMISSION (HYDRAULIC) RETARDER INFORMATION SHEET

1. The M911 commercial heavy-equipment transporter (C-HET) is equipped with a hydraulic transmission retarder that helps slow the C-HET on downgrades and curves. It has the greatest effect in the lower forward gear ranges. Push down on the hydraulic retarder pedal with your foot to apply. Do not hold for long periods. Make sure that the throttle is closed when using the retarder.

- a. To apply the retarder, release the accelerator and then depress the retarder pedal located to the left of the service brake pedal.
- b. To prevent overheating the transmission oil, fully release retarder pedal for short periods and reapply as necessary.

CAUTION

Avoid unnecessary use of the retarder. Use this pedal only to help slow your truck on curves and downgrades. Do not rest your foot on this pedal during normal driving. Long continuous use of the retarder pedal will raise the transmission fluid temperature to and beyond the safe limit and will cause damage to the transmission.

2. The instructors must *emphasis and reemphasize* the importance of the proper downhill braking procedures and the use of the engine retarder especially on slippery surfaces as outlined above. Instructors must instill in the drivers that if they do not follow these procedures, death or serious injury can result.

3. Also the instructors must explain to the students that the braking procedures are totally different when loaded and that 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: DRIVE VEHICLE ON IMPROVED (PRIMARY) ROAD WITHOUT A LOAD

TASK NUMBER: 551-721-3337 (Drive a heavy-equipment transporter [HET] on improved roads)

A. TRAINING OBJECTIVE.

TASK: Drive an M911 C-HET coupled to an empty M747 semitrailer on improved (primary) roads.

CONDITION: Given instruction, a DD Form 1970, a DA Form 2404, a pencil, TM 9 2320-270-10, equipment records folder, rags, lubricants, coolant, a suitable driving/ training area, designated driving route, C-HET coupled to an empty M747 semitrailer with BII.

STANDARDS: Drive the designated route using defensive driving (accident avoidance) methods; make right and left turns, make gradual steering corrections, signal intentions in advance, pass oncoming vehicles, maintain vehicle interval, obey highway warning and regulatory signs, operate the light switch, monitor gauges and indicator lights; upshift/downshift the main transmission through all gear ranges and use high and low range in the auxiliary transmission; manipulate the controls; and perform basic driving maneuvers to include downhill braking (using the transmission retarder) and backing using ground guides without damage to equipment or injury to personnel.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom, driver training area, and designated driving routes as scheduled.
3. Training type: Conference and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every two students for the practical exercise.

6. Training aids and equipment: Television, videocassette recorder, and tape TVT 55-22 "Driving a Loaded Equipment Transporter," hearing protection, rags, lubricants, and coolant. DA Form 2404, DD Form 1970, pencil, TM 9 2320-270-10, equipment records folder, designated route strip map, a C-HET coupled to an empty M747 semitrailer with BII for every two students. Wide load ahead and wide load follows signs are needed for each vehicle. Escort/control vehicles are required (minimum of 2 vehicles recommended). Recommend a communication system for the control vehicles.

7. References: TM 9-2320-270-10, FM 55-312, and FM 21-305.

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: Avoid unnecessary engine idling. When long idling time is necessary, maintain at least 800 rpm as indicated on the tachograph.

NOTE: If gauges or indicators show any abnormal conditions, bring the truck to a safe stop, shutdown engine, and notify organizational maintenance.

- a. Show tape TVT 55-22 "Driving a Loaded Equipment Transporter." This is an optional showing to reinforce driving tasks. This step may be deleted if the students have viewed this tape in an earlier lesson.
- b. Check gauges and indicators often. During normal driving conditions, at engine rpm range--
 - (1) The tachograph should indicate 1800 to 2100 rpm.
 - (2) The engine oil pressure gauge should read 30 to 70 psi.

(3) The engine water temperature gauge should read above 140 degrees F at the low end and up to 200 degrees F at the high end. Normal water temperature is from 160 to 185 degrees F.

(4) The air pressure gauge should register at least 60 psi. If not, the low pressure warning light and buzzer will come on. Normal air pressure for driving is 90 to 120 psi.

(5) The main transmission oil temperature gauge should register from 160 to 220 degrees F.

(6) The battery voltmeter reading is 20-30 vdc.

CAUTION

The maximum no load governed engine speed is 2225 rpm. Under a load, the governed speed is 2100 rpm. Never allow engine to exceed these speeds.

NOTE: Highway driving. When driving conditions permit, maintain the legal highway speed (maximum speed empty is 43 mph, maximum speed loaded is 27 mph with standard highway tires) in a gear range that permits running the engine 10 to 20 percent below governed speed. This is the engine cruising range and gives better fuel economy than higher engine speed. Recommended highway cruising range is 1650 to 1850 rpm. However, operating with reserve power makes good sense on hilly roads, in high winds, and other conditions. Reserve power is gained by operating in a lower gear range.

NOTE: City driving. Operate the truck in a high gear at lower engine rpm to maintain the lawful speed. When slowing down for turns and other posted speed zones, stay in your running gear and reduce engine rpm to get within the speed limit. Avoid downshifting until you are ready to return to highway speed. Recommended rpm range for city driving is 1400 to 1600 rpm.

NOTE: Off-road driving. It is limited but the maximum speed off road is between 10 and 15 mph.

c. Explain the procedures for putting the vehicle in motion--

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

(5) When signaling intentions.

CAUTION

Never shift the auxiliary transmission while the truck is moving.

CAUTION

Never let the C-HET coast in neutral. Engine braking and hydraulic retarder action are not available.

(6) When using transmission gear ranges and combinations (primary and auxiliary transmission).

d. Explain the procedures for braking when--

CAUTION

Long continuous use of the hydraulic retarder will raise oil temperature and may cause damage to the transmission.

(1) Using the transmission (hydraulic) retarder (see the information sheet on using hydraulic retarder at the end of this lesson).

(2) Using the service brakes.

(3) Driving on flat roadway.

(4) Driving downhill.

(5) Driving on sand, snow, ice, and wet surfaces.

(6) Using emergency braking procedures.

(7) Downshifting the transmission.

e. Explain maneuvering the vehicle--

(1) On curves.

(2) At intersections.

(3) On roadways:

- Steering the vehicle.
- Making gradual steering corrections.

- Avoiding abrupt steering movements.
- f. Explain procedures for changing lanes:
- (1) Signal intentions.
 - (2) Check mirrors.

CAUTION

Do not move the driveline locking system lock to the LOCK position while the truck is turning a corner or if tires are slipping. It is recommended that the truck be stopped before locking the differentials.

- g. Explain inter-axle differential and transfer case lock/unlock.

CAUTION

Do not operate the vehicle with the pusher axle in the lowered position off road, on rough roads, or on the highway without a payload.

- h. Explain when/how to lower and raise the pusher axle.
- i. Explain the following:
- (1) Steering the vehicle through a constant curve.
 - (2) Maneuvering through a U-turn.
 - (3) Passing stationary and moving vehicles (on narrow roads).
- j. Give safety briefing (see sample convoy/controller briefing at the end of this lesson).
- k. Explain ground guide safety precautions for backing the tractor semitrailer combination.
3. Practical exercise:
- a. Assign students to vehicles and issue TM 9-2320-270-10, 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 maneuvering the vehicle through the courses laid out in the training area (see Chapter 4, Figures 4-2, 4-3, and 4-4).

d. After students demonstrate proficiency maneuvering the vehicle, they should practice downhill braking.

NOTE: During-operation PMCS is also conducted at this time.

NOTE: The success of this driver training program is the ability of the instructors to get in the cab of the truck with the student driver and pass on valuable experience and proper driving techniques. Now is the time to 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. 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 the vehicles are parked.

2. Always place the transmission in neutral, set the parking brake, and shut off the engine before leaving the vehicle.

3. Ensure that students remove all jewelry and identification tags before performing PMCS.

4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.

5. Ensure that ground guides are always used when backing the C-HET.

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6. Maintain a safe following distance and speed limit when driving in the training area (as determined by the local command).

7. Always wear hearing protection when working in or around a running C-HET.

8. Ensure that personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 13.5 hours (1 conference and 12.5 practical exercise, including 1 hour PMCS).

SAMPLE ESCORT/CONTROLLER'S BRIEFING INFORMATION SHEET

1. Always follow civilian and military police instructions when given.
2. On controlled access highways, use truck parking areas only.
3. Make only emergency halts on the roadside of controlled-access highways.
4. Do not stand on the traffic side of a vehicle during halts on conventional highways.
5. Perform vehicle operation maintenance and check cargo security at every halt.
6. Move vehicles off the highway before beginning maintenance.
7. Have reflectors and warning devices in place before beginning maintenance.
8. Use warning lights during periods of darkness or reduced visibility.
9. Begin movement only at the escort/controller's signal.
10. Observe vehicle speed restrictions: _____ as determined by the local commander.
11. Observe vehicle intervals (minimums):
 - a. Controlled-access highway - 200 yards.
 - b. Rural conventional highway - 150 yards.
 - c. Urban conventional highway - 50 yards.
 - d. Blackout conditions – 60 to 180 feet.
12. Use the acceleration lane, when available, to reach highway speed.
13. Gradually attain proper vehicle interval once on the main route.
14. Operate all vehicles with headlights (except when under blackout conditions) on at all times.
15. Use warning devices correctly.
16. Remember the following: Because of the weight of the C-HET combination, roadways and curbs may give way, causing the vehicle to turn over. When approaching oncoming traffic on a narrow road—
 - a. Signal your intentions.
 - b. Move to the right of the roadway only as far as you safely can and stop.
 - c. Wait until the other vehicles have passed and resume travel on the most solid part of the road.
17. Add any additional comments as local conditions warrant.

TRANSMISSION (HYDRAULIC) RETARDER INFORMATION SHEET

1. The M911 commercial heavy-equipment transporter (C-HET) is equipped with a hydraulic transmission retarder that helps slow the C-HET on downgrades and curves. It has the greatest effect in the lower forward gear ranges. Push down on the hydraulic retarder pedal with your foot to apply. Do not hold for long periods. Make sure that the throttle is closed when using the retarder.

- a. To apply the retarder, release the accelerator and then depress the retarder pedal located to the left of the service brake pedal.
- b. To prevent overheating the transmission oil, fully release retarder pedal for short periods and reapply as necessary.

CAUTION

Avoid unnecessary use of the retarder. Use this pedal only to help slow your truck on curves and downgrades. Do not rest your foot on this pedal during normal driving. Long continuous use of the retarder pedal will raise the transmission fluid temperature to and beyond the safe limit and will cause damage to the transmission.

2. The instructors must *emphasis and reemphasize* the importance of the proper downhill braking procedures and the use of the engine retarder especially on slippery surfaces as outlined above. Instructors must instill in the drivers that if they do not follow these procedures, death or serious injury can result.

3. Also the instructors must explain to the students that the braking procedures are totally different when loaded and that 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: BACK VEHICLE WITHOUT A LOAD

TASK NUMBER: 551-721-1367 (Back vehicle with semitrailer)

A. TRAINING OBJECTIVE.

TASK: Back an M911 C-HET coupled to an empty M747 semitrailer.

CONDITION: Given instruction, a DD Form 1970, a DA Form 2404, a pencil, TM 9-2320-270-10, equipment records folder, rags, lubricants, coolant, a suitable training area, a C-HET coupled to an empty M747 semitrailer and BII.

STANDARDS: Back in a straight line, into an alley 16 feet wide and 50 feet long using ground guides, without damage to equipment or injury to personnel. Interpret correct hand and arm signals as given by a ground guide. Students will be graded on a Go/No-Go basis.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom, motor park, and training area as scheduled.
3. Training type: Conference and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every two students for the practical exercise.
6. Training aids and equipment: Hearing protection, rags, lubricants, coolant, and traffic cones, empty POL drums, or barricades. DA Form 2404, DD Form 1970, pencil, TM 9-2320-270-10, equipment records folder, a C-HET coupled to an empty M747 semitrailer and BII for every two students.
7. References: TM 9-2320-270-10, FM 55-30, and FM 21-305.

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. Explain ground guide safety precautions for backing the tractor semitrailer combination.
- b. Explain proper hand and arm signals as outlined in FM 21-305.
- c. Demonstrate backing in a straight line into an alley 16 feet wide and 50 feet long without vehicle or semitrailer drifting into outer boundary or bumping into rear boundary. When moving forward, place auxiliary transmission in low range so the vehicle moves at a reduced speed.
- d. Explain alignment of the tractor and semitrailer; always try to sight side (driver's side) back.
- e. Check to rear to ensure way is clear. Walk behind the vehicle before backing to ensure there is adequate clearance, check clearance on each side, check the top to ensure there is adequate clearance, and then check under the vehicle.
- f. Sound the horn; flash lights to warn others that your truck is about to back.
- g. Turn on four way flashers to warn others that your truck is backing.
- h. Ensure proper use and alignment of both outside rearview mirrors to check path and clearance while backing.
- i. Explain steering.
 - (1) Oversteering (turning steering wheel too much too quickly).
 - (2) Turning the steering wheel to the left makes the rear of the semitrailer go to the right.

(3) Turning the steering wheel to the right makes the rear of the semitrailer go to the left.

j. Describe objects to monitor while backing.

(1) Both sides.

(2) Clearance to the front.

(3) Clearance to the rear.

(4) Overhead clearance.

k. Back slowly and use idle speed; recommended speed is 5 mph or less.

l. If necessary, realign the tractor/semitrailer as many times as needed.

m. Keep the window open and the radio off (if equipped).

n. Explain that the driver is still responsible for results (damage).

3. Practical exercise:

a. Assign students to vehicles and issue TM 9-2320-270-10, 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 backing the empty tractor semitrailer combination through the course laid out in the training area (see Chapter 4, Figures 4-2 and 4-4). During-operation PMCS is also conducted at this time.

NOTE: The success of this driver training program is the ability of the instructors to get in the cab of the truck with the student driver and pass on valuable experience and proper driving techniques. Now is the time to correct any bad driving habits.

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

5. Summary:

a. Recap main points.

b. Allow for questions.

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- c. Clarify questions.
- d. Give closing statement.

6. Retraining: Retrain and retest No-Gos. No-Gos will be retrained and retested after normal duty hours.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when the vehicles are parked.
2. Always place the transmission in neutral, set parking brake, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Ensure that ground guides are always used when backing the C-HET.
6. Maintain a safe following distance and speed limit when driving in the training area (as determined by the local command).
7. Always wear hearing protection when working in or around a running C-HET.
8. Do not shift the auxiliary transmission while the vehicle is moving.
9. Do not shift the transfer case (differential lock/unlock control) lever to the lock position while the vehicle is moving.
10. Ensure that the driver and ground guide know and understand the hand and arm signals as outlined in FM 21-305.
11. Never back at a speed over 5 mph.
12. Ensure that personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 4 hours (.5 conference and 3.5 practical exercise including .5 PMCS).

LESSON TITLE: DRIVE VEHICLE ON UNIMPROVED (SECONDARY) ROADS WITHOUT A LOAD

TASK NUMBER: 551-721-1368 (Drive vehicle with semitrailer on side roads and unimproved roads)

A. TRAINING OBJECTIVE.

TASK: Drive an M911 (C-HET) on secondary or unimproved roads.

CONDITION: Given instruction, a DD Form 1970, a DA Form 2404, a pencil, TM 9-2320-270-10, equipment records folder, rags, lubricants, coolant, a suitable training/ driving area, and an M911 C-HET coupled to an empty M747 semitrailer, and with BII.

STANDARDS: Drive the designated route using defensive driving (accident avoidance) methods; make right and left hand turns, make gradual steering corrections, signal intentions in advance, pass oncoming vehicles, maintain vehicle interval, obey highway warning and regulatory signs, operate the light switch, monitor gauges and indicator lights, use proper braking procedures, use the transmission (hydraulic) retarder and upshift/downshift the main and auxiliary transmissions through all gears without damage to equipment or injury to personnel.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom, motor park, and designated route.
3. Training type: Conference and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every two students for the practical exercise.
6. Training aids and equipment: Television, videocassette recorder, tape TVT 55-22 "Driving a Loaded Equipment Transporter," hearing protection, rags, lubricants, and coolant. DA Form 2404, DD Form 1970, pencil, TM 9-2320-270-10, equipment records folder, route strip map, a C-HET coupled to an empty M747 semitrailer with BII for every two students.

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Wide load ahead and wide load follows signs, and escort/control vehicles (minimum of 2 vehicles required). Recommend a communication system for the control vehicles.

7. References: TM 9-2320-270-10, FM 55-312, and FM 21-305.

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 tape TVT 55-22 "Driving a Loaded Equipment Transporter." This is an optional showing to reinforce driving tasks. This step may be deleted if the students have viewed this tape in an earlier lesson.
- b. Explain the procedures for putting the vehicle in motion--
 - (1) On flat roadway.
 - (2) On upgrades.
 - (3) On downgrades.
 - (4) In sand, snow, and on ice.
- c. Explain the procedures for braking when--
 - (1) Using the transmission (hydraulic) retarder (see information on using the hydraulic retarder sheet at the end of this lesson).
 - (2) Using the trailer brakes.

- (3) Driving on level roadway.
- (4) Driving downhill.
- (5) Driving on sand, snow, ice, and wet surfaces.
- (6) Using emergency braking procedures.

d. Explain maneuvering the vehicle--

- (1) On curves.
- (2) At intersections.
- (3) On roadways:
 - Steering the vehicle.
 - Making gradual steering corrections.
 - Avoiding abrupt steering movements.

e. Explain the following:

- (1) Changing lanes.
- (2) Steering the vehicle through a constant curve.
- (3) Maneuvering through a U-turn.
- (4) Passing stationary and moving vehicles (on narrow roads).

f. Give safety briefing (see sample briefing at the end of this lesson).

3. Practical exercise:

a. Due to the size, weight, and configuration of the C-HET coupled to an M747 semitrailer, students should practice driving in a controlled training/driving area (see Chapter 4, Figures 4-2 and 4-3) until they are knowledgeable of the unique driving characteristics and feel comfortable with the vehicle. Then they should drive on assigned roadways with limited traffic until they have reached an acceptable degree of proficiency before advancing into an area with a large volume of traffic.

NOTE: During-operation PMCS is conducted at this time.

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NOTE: As each student practices driving, an assistant instructor rides in the cab and explains driving techniques, ensures the driver is aware of driving situations, and conducts after-action reviews (AARs) with each driver.

- b. 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. 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 the vehicles are parked.
2. Always place the transmission in neutral, set parking brake, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Ensure that ground guides are always used when backing the C-HET.
6. Maintain a safe following distance and speed limit when driving (as determined by the local command).
7. Always wear hearing protection when working in or around a running vehicle.
8. Ensure that personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 4 hours (.5 conference and 3.5 practical exercise including .5 PMCS).

SAMPLE ESCORT/CONTROLLER'S BRIEFING INFORMATION SHEET

1. Always follow civilian and military police instructions when given.
2. On controlled access highways, use truck parking areas only.
3. Make only emergency halts on the roadside of controlled-access highways.
4. Do not stand on the traffic side of a vehicle during halts on conventional highways.
5. Perform vehicle operation maintenance and check cargo security at every halt.
6. Move vehicles off the highway before beginning maintenance.
7. Have reflectors and warning devices in place before beginning maintenance.
8. Use warning lights during periods of darkness or reduced visibility.
9. Begin movement only at the escort/controller's signal.
10. Observe vehicle speed restrictions: _____ as determined by the local commander.
11. Observe vehicle intervals (minimums):
 - a. Controlled-access highway - 200 yards.
 - b. Rural conventional highway - 150 yards.
 - c. Urban conventional highway - 50 yards.
 - d. Blackout conditions – 60 to 180 feet.
12. Use the acceleration lane, when available, to reach highway speed.
13. Gradually attain proper vehicle interval once on the main route.
14. Operate all vehicles with headlights (except when under blackout conditions) on at all times.
15. Use warning devices correctly.
16. Remember the following: Because of the weight of the C-HET combination, roadways and curbs may give way, causing the vehicle to turn over. When approaching oncoming traffic on a narrow road—
 - a. Signal your intentions.
 - b. Move to the right of the roadway only as far as you safely can and stop.
 - c. Wait until the other vehicles have passed and resume travel on the most solid part of the road.
17. Add any additional comments as local conditions warrant.

TRANSMISSION (HYDRAULIC) RETARDER INFORMATION SHEET

1. The M911 commercial heavy-equipment transporter (C-HET) is equipped with a hydraulic transmission retarder that helps slow the C-HET on downgrades and curves. It has the greatest effect in the lower forward gear ranges. Push down on the hydraulic retarder pedal with your foot to apply. Do not hold for long periods. Make sure that the throttle is closed when using the retarder.

- a. To apply the retarder, release the accelerator and then depress the retarder pedal located to the left of the service brake pedal.
- b. To prevent overheating the transmission oil, fully release retarder pedal for short periods and reapply as necessary.

CAUTION

Avoid unnecessary use of the retarder. Use this pedal only to help slow your truck on curves and downgrades. Do not rest your foot on this pedal during normal driving. Long continuous use of the retarder pedal will raise the transmission fluid temperature to and beyond the safe limit and will cause damage to the transmission.

2. The instructors must *emphasis and reemphasize* the importance of the proper downhill braking procedures and the use of the engine retarder especially on slippery surfaces as outlined above. Instructors must instill in the drivers that if they do not follow these procedures, death or serious injury can result.

3. Also the instructors must explain to the students that the braking procedures are totally different when loaded and that 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: LOAD AN M1 TANK ONTO A SEMITRAILER

TASK NUMBER: 551-721-3345 (Load tracked/wheeled vehicles onto a heavy-equipment transporter [HET])

A. TRAINING OBJECTIVE.

TASK: Load an M1 tank onto an M747 semitrailer.

CONDITION: Given instruction, a DD Form 1970, a DA Form 2404, a pencil, TM 9-2320-270-10, TM 9-2330-294-14, TM 55-2350-255-14, equipment records folder, rags, lubricants, coolant, an M911 C-HET, an M747 semitrailer, basic issue items (BII), an M1 tank, and a suitable training area.

STANDARDS: Load an M1 tank onto an M747 semitrailer in the proper sequence and follow all safety precautions without damage to equipment or injury to personnel.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom and suitable training area.
3. Training type: Conference and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every three students for the practical exercise.
6. Training aids and equipment: Television, videocassette record, TVT 55-21 "Loading and Unloading an Equipment Transporter," hearing protection, work gloves, rags, lubricants, and coolant. DA Form 2404, DD Form 1970, pencil, TM 9-2320-270-10, TM 9-2330-294-14, TM 55-2350-255-14, equipment records folder, an M1 tank, an M911 C-HET coupled to an M747 semitrailer, and BII for every three students. Slow moving sign for rear of vehicle.
7. References: AR 385-30, FM 21-60, TM 9-2320-270-10, TM 9-2330-294-14, and TM 55-2350-255-14.

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 tape TVT 55-21 "Loading and Unloading an Equipment Transporter."
- b. Align tractor semitrailer combination as close as possible (6 feet or less) to the M1 tank on as level ground as possible.

NOTE: The M1 tank must be loaded onto the semitrailer so that the gun tube faces the rear of the tank and the semitrailer. The turret traverse and the gun-elevating mechanism must be in the travel position and locked to prevent rotation. If this is not done, it will create an unsafe condition.

SAFETY NOTE: Be sure to use ground guides when backing the vehicle.

- c. Preparation of the tractor by the operator.
 - (1) Apply parking brakes by pulling out the parking brake control.
 - (2) Move the main transmission lever to the neutral (N) position.
 - (3) Move the auxiliary transmission shift lever to the neutral (N) position.
 - (4) Move the power take-off (PTO) control to the engage position.
 - (5) Place the main transmission range selector lever in the D position.
 - (6) Adjust the pusher axle to load specification.
 - (7) Check that PTO/AUX throttle indicator light (on instrument panel in cab) is on.

WARNING

Always wear hearing protection at cab and winch operator's station.

d. Preparation of the semitrailer by the crew members.

- (1) Chock the wheels on the semitrailer (between axles 7 and 8).
- (2) Install support blocks under each rear corner of the semitrailer.
- (3) Position the air control handle to accommodate the payload as follows:
 - (a) Full load position for transporting payload of 35 to 60 tons (85 psi air pressure in air springs). For payloads over 60 tons, the 85 psi regulator valve must be reset to 95 psi.
 - (b) The no load position for operating semitrailers with axles 7 and 8 raised (100 psi air pressure in air lifts). This position provides a shorter turning radius and reduces tire wear on the two rear axles when making turns without a payload.
- (4) Disconnect ramp tie-down chains from each ramp and lower ramps to the ground. Adjust ramps to the width of the load.

NOTE: The ramps can easily be raised and lowered by two crew members.

- (5) Remove safety warning light.
- (6) Remove all load binders, curbing, chains, clamps, and hemp rope from the storage compartment of the trailer.
- (7) Unwind the hemp rope and lay the rope doubled up along the whole length of trailer bed.
- (8) Position the rope over cross members.

NOTE: The loop in the rope should be at the front and the loose ends at the rear of the semitrailer bed. This rope is used to reeve (pull) the winch cable to the rear snatch block during unloading.

- (9) Position curbing on the deck of the semitrailer for the tank being loaded. Make sure curbs are at position F during loading. As soon as the load is on the semitrailer and before moving the load forward, move curbs from position F to position A. The inside curbing is used to restrain

sideways movement and must be adjusted to fit the inside width of the tank.

e. Procedures prior to starting winching operations for operator and crew members.

(1) Crew members disconnect winch cable cleaves from anchors on the truck body.

WARNING

Always wear heavy gloves when handling cable. Never allow the cable to run through hands.

WARNING

Direct personnel not to walk behind tank during loading operations. Load may roll back causing death or serious injury.

WARNING

If the tank engine has been running, warn personnel of extreme heat from the exhaust system. It can cause severe burns.

WARNING

The winch operator and ground guides must know the correct hand signals for winching operations as defined in FM 21-60.

(2) Operator moves winch control panel throttle release safety to the on position. Engine throttle is now operational at the winch control panel.

NOTE: Each winch is equipped with an automatic safety brake, which will stop and hold a payload when movement ceases.

NOTE: Engine may be shut down to stop winching operation if necessary by using the engine shutdown control.

(3) Operator pulls the engine throttle as far back as it will go (toward the cab). Main transmission will shift through its 2 to 5 range.

(4) Operator checks instrument panel tachograph (in cab) after final upshift. Engine speed should stabilize at about 2200 rpm.

(5) Operator moves number 1 (passenger side) and number 2 (driver side) winch low speed lever forward (toward rear of semitrailer) to pay out cable and backward (toward cab) to take up cable at low speed.

NOTE: Only one winch can be operated at a time in high speed.

NOTE: Both winches can be operated at the same time with full load in low speed.

NOTE: The winches will operate in the same direction or opposite directions at the same time in low speed.

CAUTION

Never operate a winch at high speed when there is a load on the winch cable. High speed is intended for no-load operation only. Failure to follow this caution can result in equipment damage.

CAUTION

Never operate either winch with less than four turns of the cable on the drum.

(6) For high speed operation, operator moves high speed lever and low speed lever at the same time and in the same direction. Move both levers forward to pay out cable and backwards to take up cable at high speed.

(7) To operate both winches at the same time (low speed only), the operator--

(a) Pulls the engine throttle control as far back as it will go (toward cab).

(b) Moves the number 1 and 2 winches low speed lever at the same time. Moves both levers forward to pay out cable and backwards to take up cable.

(8) Operator directs crew members to attach snatch blocks to the left and right front towing eye of the tank.

(9) Operator pays out winch cables and the crew members attach them.

(a) Operator directs crew members to thread cable ends through upper gooseneck roller and anchor cable ends to gooseneck. Walk straight out from winch station to the rear of semitrailer (do not cross cables) with cables until loop in cables reaches snatch blocks on tank.

(b) Crew members place and secure cables in snatch blocks.

(10) Operator takes up the slack in the winch cables; crew member signals when the slack is out of the cables.

WARNING

All personnel not involved in the winching operation will stand clear of winch cables and payload.

WARNING

Use extreme caution when winching, and post crew members as guides (one on each side of semitrailer). The winch operator must obey the hand signals from the primary ground guide (left [drivers] side of semitrailer). The guide on the right [passenger] side relays signals to the guide on the left side of semitrailer unless in an emergency situation. The ground guides will move forward as the tank is moved forward on the semitrailer. The ground guides will keep visual contact with each other and with the winch operator at all times.

WARNING

At no time during the loading operation should personnel be on the semitrailer bed.

- f. Operator starts the winching operation.
- g. Operator stops the winching operation.
- h. Crew members ensure rigging on the tank is secure and the tank is aligned with the approach ramps on the trailer.

NOTE: Keep both winch cables under tension at all times.

- i. Operator continues winching operation.
- j. Operator and crew members repeat steps e through g until the rear of the tank clears the rear most curbing (F position).
- k. Operator stops winching operation.
- l. Crew members place chock blocks between tank's road wheel (one on each side of the tank) as a safety precaution.
- m. Crew members move curbing from position F to position A.
- n. Crew members remove chock blocks from tank's road wheel.

- o. Operator continues winching operation.
- p. When the tank is approximately three feet from the gooseneck bumper, crew member directs the operator to stop the winching operations.
 - (1) Crew members place chock blocks between tank's road wheel (one on each side of the tank) as a safety precaution.
 - (2) Crew member directs the operator to release tension on winch cables.
 - (3) Crew members remove winch cables from snatch blocks.
 - (4) Crew members remove snatch blocks from tank's left and right towing eye.
 - (5) Crew members connect winch cables to tank's left and right towing eye.
 - (6) Crew members remove chock blocks from tank's road wheel.
- q. Operator continues winching operation until the tank is snug against the gooseneck bumpers.
 - (1) Crew members place chock blocks between tank's road wheels (one on each side of the tank).
 - (2) Crew members direct operator to release tension on the winch cables.
- r. Crew members remove the winch cables from the towing eyes. Crew members must keep cables taut while the operator is taking it up.
- s. Operator takes up cable while crew members watch the drum to make sure the cable winds evenly on the drum without tangles, kinks, or twists. Cable coils should be tight and close together on the drum.
- t. Operator directs crew members to signal when enough slack has been taken up to prevent the cable from unwinding over drum flanges when attached to the anchor. Operator stops winch and directs crew members to bolt cable clevis to anchor.

NOTE: Crew members check the tires on the semitrailer.

- u. Operator disengages winch controls.
- v. Operator follows normal winch shutdown procedures.

- (1) Push the engine throttle control fully forward (away from cab) to reduce engine rpm.
- (2) Disengage the PTO.
- (3) Move the throttle release safety switch to the off position.
- (4) Verify that the PTO/AUX throttle indicator light is off.
- (5) Move the main transmission range selector lever to the neutral (N) position. Check that the parking brake is still applied and the auxiliary transmission selector lever still in neutral. Winches are now shut down.

CAUTION

Allow the turbocharger to slow down, and allow both the turbocharger and engine to cool. Run the engine at 800 to 1000 rpm at no load for 3 to 5 minutes before shutting down. The amount of cool down time needed will depend on how hard the engine was worked. Failure to cool may cause damage to the engine and/or turbocharger.

- w. Operator and crew members secure the tank to the trailer for travel.
 - (1) Connect the "D" ring side of the chain (one chain to the left and one chain to the right) to the lifting eyes on the tank.
 - (2) Pass the hook end of the chains through the gooseneck rollers.
 - (3) Position the load binders (one to the left side and one to the right side) to the tie-down cleats on the gooseneck. Ratchet the load binders to the full extension.
 - (4) Attach the load binders to the chains, take up the slack, and tighten the load binders.
 - (5) Attach the load binders to the semitrailer tie-down brackets with the shackles at the rear of the payload. Ratchet the load binders to the full extension.
 - (6) Attach the chain to each payload towing lug with the shackles, cross the chains, and attach to each load binder grab hook.

NOTE: Crossing the chains will prevent the payload from shifting during travel.

- (7) Take up the slack and tighten the load binders.
- x. Preparing the semitrailer for travel.

- (1) Ensure all payload chains are tight.
- (2) Ensure the air control handle is in the proper position for the payload.
- (3) Ensure the landing gear is raised and the swingaway rollers are in the stowed position.
- (4) Ensure the retractable clearance lights are in the retracted position for regular loads or are extended for all loads that are wider than the bed of the semitrailer.
- (5) Ensure the ramps are raised and secured with the tie-down assemblies.
- (6) Ensure all BII are stowed properly on the semitrailer.
- (7) Remove the support blocks from the rear of the semitrailer.
- (8) Use the towing vehicle controls and ensure the semitrailer brakes and lights are operating.
- (9) Check the tires on the semitrailer.
- (10) Install the safety warning light.

y. Preparation of the tank by the tank crew.

- (1) The turret traverse and the gun-elevating mechanism must be in the travel position and locked to prevent rotation.
- (2) The antennas must be tied down or removed.
- (3) The headlights must be removed.
- (4) The hatches must be in the closed position.
- (5) All the loose gear must be secured with nylon cord or a suitable substitute.
- (6) The wind sensor must be folded down.
- (7) The external machine guns must be removed and secured in a suitable storage area.
- (8) After the tank is placed at the tie-down position, the crew places the transmission in the neutral position and sets the brakes.

3. Practical exercise:
 - a. Assign students to vehicles and issue TM 9-2320-270-10, TM 9-2330-294-14, TM 55-2350-255-14, pencils, DA Form 2404, DD Form 1970, and equipment records folder. Instruct students on the location of rags, lubricants, and coolant (see Chapter 4, Figure 4-5).
 - b. Students perform before-operation PMCS on tractor and semitrailer according to the appropriate TMs.
4. Evaluate: Check each student's performance of PMCS and the procedures for loading an M1 tank.
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. Load the M1 tank onto the semitrailer so the gun tube faces the rear of the tank and the semitrailer. The turret traverse and the gun-elevating mechanism must be in the travel position and locked to prevent rotation. If this is not done, it will create an unsafe condition.
2. Ensure that all chock blocks are in place when the vehicle is parked.
3. Always place the transmission in neutral, set the parking brake (except in extreme cold), and shut off the engine before leaving the vehicle.
4. Ensure that students remove all jewelry and identification tags before performing PMCS.
5. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
6. Ensure that ground guides are always used when backing the vehicle.
7. Always wear hearing protection when working in or around a running vehicle.

8. Always wear heavy gloves when handling the cable. Never allow the cable to run through hands.

9. All personnel not involved in the winching operation will stand clear of the winch cables and payload.

10. Direct personnel not to walk behind the tank during loading operations. The load may roll back causing death or serious injury.

11. If the tank engine has been running, warn personnel of extreme heat from the exhaust system. It can cause severe burns.

12. At no time during the loading operation should personnel be on the semitrailer bed.

13. Ensure that the winch operator and guides know the correct hand and arm signals used in the winching operations as defined in FM 21-60.

14. Use extreme caution when winching and post crew members as guides (one on each side of semitrailer). The winch operator must obey hand signals from the primary ground guide left (driver's side of semitrailer). The guide on the right (passenger's side) relays signals to the guide on the left side of the semitrailer unless in an emergency situation. The ground guides will keep visual contact with each other and with the winch operator at all times.

15. Never operate a winch at high speed when there is a load on the winch cable. High speed is intended for no-load operation only. Failure to follow this caution can result in equipment damage.

16. Never operate either winch with less than four wraps of cable on the drum.

17. Instruct operators as follows:

- a. Only one winch can be operated at a time in high speed.
- b. Both winches can be operated at the same time with full load in low speed.
- c. The winches will operate in the same direction or opposite directions at the same time in low speed.

18. Keep the winch cables under tension at all times.

19. Allow the turbocharger to slow down, and both the turbocharger and engine to cool. Run the engine at 800 to 1000 rpm at no load for 3 to 5 minutes before shutting down. The amount of cool down time needed will depend on how hard the engine was worked. Failure to cool the engine may cause damage to the engine and/or turbocharger.

20. Check the tire inflation on the tractor and semitrailer.

21. Get a slow moving sign for the rear of your vehicle with NSN 9905-01-057-3894. It's required by paragraph 3-13 of AR 385-30 for slow moving vehicles operating 25 mph or less on public highways in CONUS. Use Appendix A of CTA 50-970 as your authority to order it.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 4 hours (.5 conference and 3.5 practical exercise, including .5 PMCS).

LESSON TITLE: BACK A LOADED VEHICLE

TASK NUMBER: 551-721-1367 (Back vehicle with semitrailer)

A. TRAINING OBJECTIVE.

TASK: Back an M911 C-HET coupled to a loaded M747 semitrailer.

CONDITION: Given instruction, a DD Form 1970, a DA Form 2404, a pencil, TM 9-2320-270-10, equipment records folder, rags, lubricants, coolant, a suitable training area, a C-HET coupled to a loaded M747 semitrailer, and BII.

STANDARDS: Back in a straight line, into an alley 16 feet wide and 50 feet long using ground guides, without damage to equipment or injury to personnel. Interpret correct hand and arm signals as given by a ground guide. Students will be graded on a Go/No-Go basis.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom, motor park, and training area as scheduled.
3. Training type: Conference and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every two students for the practical exercise.
6. Training aids and equipment: Hearing protection, rags, lubricants, coolant, and traffic cones, empty POL drums, or barricades. DA Form 2404, DD Form 1970, pencil, TM 9-2320-270-10, equipment records folder, an M911 coupled to an M747 semitrailer, loaded with an M1 main battle tank, and BII for every two students.
7. References: TM 9-2320-270-10, FM 55-30, and FM 21-305.

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. Explain ground guide safety precautions for backing the tractor semitrailer combination. Also, explain correct hand and arm signals as outlined in FM 21-305.
- b. Demonstrate backing in a straight line into an alley 16 feet wide and 50 feet long without vehicle or semitrailer drifting into outer boundary or bumping into rear boundary (see Chapter 4 for examples of training area). When moving forward, place transfer case in low range so the vehicle moves at a reduced speed.
- c. Ensure alignment of tractor and semitrailer; always try to sight side (driver side) back if you have to back.
- d. Check to rear to ensure way is clear. Walk behind the vehicle before backing to ensure there is adequate clearance, check clearance on each side, check the overhead clearance, and then check under the vehicle for obstacles.
- e. Sound horn; flash lights to warn others that your truck is about to back.
- f. Turn on four-way flashers to warn others that your truck is backing.
- g. Ensure proper use and alignment of both outside rearview mirrors to check path and clearance while backing.
- h. Explain steering.
 - (1) Oversteering (turning steering wheel too much too quickly).
 - (2) Turning the steering wheel to the left makes the rear of the semitrailer go to the right.

(3) Turning the steering wheel to the right makes the rear of the semitrailer go to the left.

i. Describe objects to monitor while backing.

(1) Both sides.

(2) Clearance to the front.

(3) Clearance to the rear.

(4) Overhead clearance.

j. Back slowly and use idle speed; recommended speed is 5 mph or less.

k. If necessary, realign the tractor semitrailer as many times as needed.

l. Keep window open and radio (if equipped) off.

m. Explain the difference in response of semitrailer when it is empty and loaded.

n. Explain that the driver is still responsible for results (damage).

3. Practical exercise:

a. Assign students to vehicles and issue TM 9-2320-270-10, 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 backing the loaded tractor semitrailer combination through the course laid out in the training area (see Chapter 4, Figures 4-2 and 4-4). During-operation PMCS is also conducted at this time.

NOTE: The success of this driver training program is the ability of the instructors to get in the cab of the truck with the student driver and pass on valuable experience and proper driving techniques. Now is the time to correct any bad driving habits.

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

5. Summary:

a. Recap main points.

b. Allow for questions.

- c. Clarify questions.
- d. Give closing statement.

6. Retraining: Retrain and retest No-Gos. No-Gos will be retrained and retested after normal duty hours.

E. SAFETY RESTRICTIONS.

1. Ensure all chock blocks are in place when vehicles are parked.
2. Always place the transmission in neutral, set the parking brake, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Ensure that ground guides are always used when backing the C-HET.
6. Maintain a safe following distance and speed limit when driving in the training area (as determined by the local command).
7. Always wear hearing protection when working in or around a running C-HET.
8. Do not shift the auxiliary transmission while the vehicle is moving.
9. Do not shift the transfer case (differential lock/ unlock control) lever to the lock position while the vehicle is moving.
10. Ensure that the driver and ground guide know and understand the hand and arm signals as outlined in FM 21-305.
11. Never back at a speed over 5 mph.
12. Ensure that personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 5.5 hours (.5 conference and 5.0 practical exercise including .5 PMCS).

LESSON TITLE: DRIVE A LOADED VEHICLE ON IMPROVED (PRIMARY) ROADS

TASK NUMBER: 551-721-3337 (Drive a heavy-equipment transporter [HET] on improved roads)

A. TRAINING OBJECTIVE.

TASK: Drive an M911 (C-HET) with a loaded M747 semitrailer on improved (primary) roads.

CONDITION: Given instruction, a DD Form 1970, a DA Form 2404, a pencil, TM 9 2320-270-10, equipment records folder, rags, lubricants, coolant, a suitable driving/training area, designated driving route, and a C-HET coupled to an M747 semitrailer loaded with an M1 main battle tank. BII for the tractor and semitrailer.

STANDARDS: Drive the designated route using defensive driving (accident avoidance) methods; make right and left turns, make gradual steering corrections, signal intentions in advance, pass oncoming vehicles, maintain vehicle interval, obey highway warning and regulatory signs, operate the light switch, monitor gauges and indicator lights; upshift/downshift the main transmission through all gear ranges and use the high and low range in the auxiliary transmission; manipulate the controls; and perform basic driving maneuvers to include downhill braking (using the transmission retarder) and backing using ground guides without damage to equipment or injury to personnel.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom, training area, and designated driving routes as scheduled.
3. Training type: Conference and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every two students for the practical exercise.

6. Training aids and equipment: Television, videocassette recorder, tape TVT 55-22 "Driving a Loaded Equipment Transporter," hearing protection, rags, lubricants, and coolant. DA Form 2404, DD Form 1970, pencil, TM 9 2320-270-10, equipment records folder, designated route strip map, a C-HET coupled to an M747 semitrailer loaded with an M1 tank, and BII for every two students. Wide load ahead and wide load follows signs. Escort/control vehicles are required (minimum of 2 vehicles recommended). Recommend a communication system for the control vehicles.

7. References: TM 9-2320-270-10, FM 55-312, and FM 21-305.

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: Avoid unnecessary engine idling. When long idling time is necessary, maintain at least 800 rpm as indicated on the tachograph.

NOTE: If gauges or indicators show any abnormal conditions, bring the truck to a safe stop, shutdown engine, and notify organizational maintenance.

- a. Show tape TVT 55-22 "Driving a Loaded Equipment Transporter." This is an optional showing to reinforce driving tasks. This step may be deleted if the students have viewed this tape in an earlier lesson.
- b. Check gauges and indicators often. During normal driving conditions, at engine rpm range--
 - (1) The tachograph should indicate 1800 to 2100 rpm.
 - (2) The engine oil pressure gauge should read 30 to 70 psi.

(3) The engine water temperature gauge should read above 140 degrees F at the low end and up to 200 degrees F at the high end. Normal water temperature is from 160 to 185 degrees F.

(4) The air pressure gauge should register at least 60 psi. If not, the low pressure warning light and buzzer will come on. Normal air pressure for driving is 90 to 120 psi.

(5) The main transmission oil temperature gauge should register from 160 to 220 degrees F.

(6) The battery voltmeter reading is 20-30 vdc.

CAUTION

The maximum no load governed engine speed is 2225 rpm. Under a load, the governed speed is 2100 rpm. Never allow engine to exceed these speeds.

CAUTION

Highway driving. When driving conditions permit, maintain the legal highway speed (maximum speed empty is 43 mph, maximum speed loaded is 27 mph with standard highway tires) in a gear range that permits running the engine 10 to 20 percent below governed speed. This is the engine cruising range and gives better fuel economy than higher engine speed. Recommended highway cruising range is 1650 to 1850 rpm. However, operating with reserve power makes good sense on hilly roads, in high winds, and other conditions. Reserve power is gained by operating in a lower gear range.

CAUTION

City driving. Operate the truck in a high gear at lower engine rpm to maintain the lawful speed. When slowing down for turns and other posted speed zones, stay in your running gear and reduce engine rpm to get within the speed limit. Avoid downshifting until you are ready to return to highway speed. Recommended rpm range for city driving is 1400 to 1600 rpm.

NOTE: Due to the added weight of the M1 main battle tank on the M747 semitrailer, there is an increase in the amount of stress and strain on the tires. Only the toughest tires can take it. The tire for the job is the desert tire, NSN 2610-00-177-7022. Make sure the tires have the correct tire air pressure, 80-85 psi. As the temperature raises, the road gets hotter. The combination of speed and heat will cause your semitrailer tires to blow. Listed below is the recommended maximum safe speed for the different temperatures:

- 80°F and above is 15 mph.

- 50°F-80°F is 25 mph.
- Below 50°F is 35 mph.

c. Explain the procedures for putting the vehicle in motion--

- (1) On flat roadway.
- (2) On upgrades.
- (3) On downgrades.
- (4) In sand, snow, and on ice.
- (5) When signaling intentions.

CAUTION

Never shift the auxiliary transmission while the truck is moving.

CAUTION

Never let the C-HET coast in neutral. Engine braking and hydraulic retarder action are not available.

- (6) When using transmission gear ranges and combinations (primary and auxiliary transmission).

d. Explain the procedures for braking when--

NOTE: The instructor must emphasize and reemphasize the difference when braking with a load and without a load especially downhill or on slippery surfaces.

CAUTION

Long, continuous use of the hydraulic retarder will raise oil temperature and may cause damage to the transmission. (Information on using the hydraulic retarder is at the end of this lesson.)

- (1) Using the transmission (hydraulic) retarder.
- (2) Using the service brakes.
- (3) Driving on flat roadway.
- (4) Driving downhill.
- (5) Driving on sand, snow, ice, and wet surfaces.

(6) Using emergency braking procedures.

(7) Downshifting the transmission.

e. Explain maneuvering the vehicle--

(1) On curves.

(2) At intersections.

(3) On roadways:

- Steering the vehicle.
- Making gradual steering corrections.
- Avoiding abrupt steering movements.

f. Explain procedures for changing lanes:

(1) Signal intentions.

(2) Check mirrors.

CAUTION

Do not move the driveline locking system lock to the lock position while the truck is turning a corner or if tires are slipping. It is recommended that the truck be stopped before locking the differentials.

g. Explain inter-axle differential and transfer case lock/unlock.

CAUTION

Do not operate the vehicle with the pusher axle in the lowered position off road, on rough roads, or on the highway without a payload.

h. Explain when/how to lower and raise the pusher axle.

i. Explain the following:

(1) Steering the vehicle through a constant curve.

(2) Maneuvering through a U-turn.

(3) Passing stationary and moving vehicles (on narrow roads).

- j. Give safety briefing (see example at the end of this lesson).
- k. Demonstrate hand and arm signals required for this exercise.
- l. Explain ground guide safety precautions for backing the tractor semitrailer combination.

3. Practical exercise:

- a. Assign students to vehicles and issue TM 9-2320-270-10, 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 maneuvering the vehicle through the courses laid out in the training area(s). See Chapter 4, Figures 4-2 and 4-3. Once the student is comfortable with the feel of the C-HET and the instructor is confident with the student's driving abilities and knowledge, the student should be permitted to drive on the road with a qualified instructor.
- d. After students demonstrate proficiency maneuvering the vehicle, they should practice downhill braking.

NOTE: During-operation PMCS is also conducted at this time.

NOTE: The success of this driver training program is the ability of the instructors to get in the cab of the truck with the student driver and pass on valuable experience and proper driving techniques. Now is the time to 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. 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.

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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 the vehicles are parked.
2. Always place the transmission in neutral, set the parking brake, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Ensure that ground guides are always used when backing the C-HET.
6. Maintain a safe following distance and speed limit when driving in the training area (as determined by the local command).
7. Always wear hearing protection when working in or around a running C-HET.
8. Ensure that personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 38 hours (1 conference and 37 practical exercise including 5 hour PMCS).

SAMPLE ESCORT/CONTROLLER'S BRIEFING INFORMATION SHEET

1. Always follow civilian and military police instructions when given.
2. On controlled access highways, use truck parking areas only.
3. Make only emergency halts on the roadside of controlled-access highways.
4. Do not stand on the traffic side of a vehicle during halts on conventional highways.
5. Perform vehicle operation maintenance and check cargo security at every halt.
6. Move vehicles off the highway before beginning maintenance.
7. Have reflectors and warning devices in place before beginning maintenance.
8. Use warning lights during periods of darkness or reduced visibility.
9. Begin movement only at the escort/controller's signal.
10. Observe vehicle speed restrictions: _____ as determined by the local commander.
11. Observe vehicle intervals (minimums):
 - a. Controlled-access highway - 200 yards.
 - b. Rural conventional highway - 150 yards.
 - c. Urban conventional highway - 50 yards.
 - d. Blackout conditions – 60 to 180 feet.
12. Use the acceleration lane, when available, to reach highway speed.
13. Gradually attain proper vehicle interval once on the main route.
14. Operate all vehicles with headlights (except when under blackout conditions) on at all times.
15. Use warning devices correctly.
16. Remember the following: Because of the weight of the C-HET combination, roadways and curbs may give way, causing the vehicle to turn over. When approaching oncoming traffic on a narrow road—
 - a. Signal your intentions.
 - b. Move to the right of the roadway only as far as you safely can and stop.
 - c. Wait until the other vehicles have passed and resume travel on the most solid part of the road.
17. Add any additional comments as local conditions warrant.

TRANSMISSION (HYDRAULIC) RETARDER INFORMATION SHEET

1. The M911 commercial heavy-equipment transporter (C-HET) is equipped with a hydraulic transmission retarder that helps slow the C-HET on downgrades and curves. It has the greatest effect in the lower forward gear ranges. Push down on the hydraulic retarder pedal with your foot to apply. Do not hold for long periods. Make sure that the throttle is closed when using the retarder.

- a. To apply the retarder, release the accelerator and then depress the retarder pedal located to the left of the service brake pedal.
- b. To prevent overheating the transmission oil, fully release retarder pedal for short periods and reapply as necessary.

CAUTION

Avoid unnecessary use of the retarder. Use this pedal only to help slow your truck on curves and downgrades. Do not rest your foot on this pedal during normal driving. Long continuous use of the retarder pedal will raise the transmission fluid temperature to and beyond the safe limit and will cause damage to the transmission.

2. The instructors must *emphasis and reemphasize* the importance of the proper downhill braking procedures and the use of the engine retarder especially on slippery surfaces as outlined above. Instructors must instill in the drivers that if they do not follow these procedures, death or serious injury can result.

3. Also the instructors must explain to the students that the braking procedures are totally different when loaded and that 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: UNLOAD AN M1 TANK OFF A SEMITRAILER

TASK NUMBER: 551-721-3346 (Unload tracked/wheeled vehicles off a heavy-equipment transporter [HET])

A. TRAINING OBJECTIVE.

TASK: Unload an M1 tank off an M747 semitrailer.

CONDITION: Given instruction, a DD Form 1970, a DA Form 2404, a pencil, TM 9-2320-270-10, TM 9-2330-294-14, TM 55-2350-255-14, equipment records folder, rags, lubricants, coolant, an M911 C-HET coupled to an M747 semitrailer, BII, an M1 tank, and a suitable training area.

STANDARDS: You must unload an M1 tank off an M747 semitrailer using a commercial heavy-equipment transporter (C-HET) in the proper sequence and follow all safety precautions without damage to equipment or injury to personnel.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom, motor park, and training area.
3. Training type: Conference and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every three students for the practical exercise.
6. Training aids and equipment: Television, videocassette recorder, tape TVT 55-21 "Loading and Unloading an Equipment Transporter," hearing protection, work gloves, rags, lubricants, and coolant. DA Form 2404, DD Form 1970, pencil, TM 9-2320-270-10, TM 9-2330-294-14, TM 55-2350-255-14, equipment records folder, an M1 tank, an M911 C-HET, an M747 semitrailer, and BII for every three students. Slow moving sign for rear of the vehicle.
7. References: AR 385-30, FM 21-60, TM 9-2320-270-10, TM 9-2330-294-14, and TM 55-2350-255-14.

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 tape TVT 55-21 "Loading and Unloading an Equipment Transporter."
- b. Select a suitable location for unloading.
- c. Align tractor and semitrailer.

SAFETY NOTE: Be sure to use ground guides when backing the vehicle.

- d. Preparation of tractor by the operator.
 - (1) Apply parking brakes by pulling out the parking brake control.
 - (2) Move the main transmission lever to the neutral (N) position.
 - (3) Move the auxiliary transmission shift to the neutral (N) position.
 - (4) Move the power take-off (PTO) control to the engage position.
 - (5) Place the main transmission range selector lever in the D position.
 - (6) Check that the PTO/AUX throttle indicator light (on instrument panel in cab) is on.
- e. Preparation of semitrailer by crewmember.
 - (1) Chock the wheels on semitrailer (between axles 7 and 8).

- (2) Install support blocks under each rear corner of the semitrailer.
- (3) Disconnect the ramp tie-down chains from each ramp and lower the ramps to the ground. Adjust the ramps to the width of the load.

NOTE: The ramps can easily be raised and lowered by the operator and a crewmember.

- (4) Remove the safety warning light.
- (5) Ensure the retractable clearance lights are in the retracted position.

f. Preparation prior to starting winch operations for the operator and crew members.

- (1) Crewmembers disconnect the winch cable clevises from the anchors on the truck body.

WARNING

Always wear heavy gloves when handling cable. Never allow the cable to run through your hands.

WARNING

Always wear hearing protection at cab and winch operator's station.

- (2) Operator moves the winch control panel throttle release safety to the on position. Engine throttle is now operational at the winch control panel.
- (3) Operator pulls the engine throttle as far back as it will go (toward the cab). The main transmission will shift through its 2 to 5 range.
- (4) Operator checks the instrument panel tachograph (in cab) after the final upshift. The engine speed should stabilize at about 2200 rpm.
- (5) Operator moves the number 1 (passenger side) and the number 2 (driver side) winch low speed lever forward (toward rear of semitrailer) to pay out the cable and backward (toward cab) to take up the cable at low speed.

NOTE: Each winch is equipped with an automatic safety brake, which will stop and hold a payload when movement ceases.

NOTE: Engine may be shut down to stop winching operation if necessary by using engine shutdown control.

CAUTION

Never operate a winch at high speed when there is a load on the winch cable. High speed is intended for no-load operation only. Failure to follow this caution can result in equipment damage.

CAUTION

Never operate either winch with less than four wraps of the cable on the drum.

(6) For high-speed operation, the operator moves the high-speed lever and the low speed lever at the same time and in the same direction. Move both the levers forward to pay out the cable and backwards to take up the cable at high speed.

(7) To operate both winches at the same time (low speed only), the operator--

(a) Pulls the engine throttle control as far back as it will go (toward cab).

(b) Moves the number 1 and 2 winch low speed levers at the same time. Move both the levers forward to pay out the cable and backwards to take up the cable.

NOTE: Only one winch can be operated at a time in high speed.

NOTE: Both winches can be operated at the same time with full load in low speed.

NOTE: The winches will operate in the same direction or opposite directions at the same time in low speed.

(8) Crewmembers place chock blocks between the tank's road wheels (one on each side of the tank).

NOTE: During the winching operations, the winch operator and guides must know the correct hand signals as defined in FM 21-60.

(9) Crewmembers connect the "V" chain to the front towing eyes of the tank.

(10) Crewmember lowers the swingaway roller. It directs the #2 (drivers side) winch cable during unloading operations.

(11) Crewmember directs operator to release the tension on the #2 winch cable.

- (12) Crewmembers thread the #2 winch cable through the swingaway roller.
- (13) Next, the crewmembers thread the #2 winch cable through the platform roller and then through the loop in the reeve rope that was laid out during the loading operation.
- (14) Crewmembers release and remove the rear tie- down chains and binders.
- (15) Crewmembers then connect the #2 cable end to the "V" chain.
- (16) Operator starts paying out the #2 cable.
- (17) Crewmembers pull the #2 cable under the tank to the rear snatch block mounted on the rear of the semitrailer.
- (18) When the cable will reach the snatch block, a crewmember directs the operator to stop paying out the cable.
- (19) Crewmembers remove the rope, place the loop of the winch cable into the snatch block, and then secure the block.
- (20) Crewmembers remove the chock blocks from the road wheels of the tank and place them approximately four feet to the rear of the tracks of the tank.
- (21) Crewmembers remove the front tie downs and binders.
- (22) Ground guide signals the winch operator to slowly winch the tank back to the chock blocks.
- (23) Once the tank has reached the chock blocks, the ground guide signals the operator to stop the winching operations.
- (24) Crewmembers place the chock blocks back between the road wheels of the tank.
- (25) The crewmembers attach the first snatch block to the right towing eye of the tank and the second snatch block to the shackle mounted below the lower gooseneck roller.
- (26) Crewmembers remove the curbing from the A position and place it in the F position.

(27) Now the crewmembers pay out the #1 (passenger side) winch cable to rig a three-to-one snubber line. This cable is used to hold the tank and lower it to the ground when it starts down the ramps.

(28) Crew members thread the #1 cable through the upper gooseneck roller, through the snatch block mounted on the tank, and then through the snatch block mounted on the gooseneck. The cable end is anchored to the left towing eye of the tank with a shackle.

(29) When the ground guides are sure that the rigging is safe and secure, they will remove the chock blocks from the tank's road wheels and move to their positions.

WARNING

At this time, ensure that all personnel not involved in the winching operation stand clear of the winch cables and payload.

WARNING

Direct personnel not to walk behind the tank during the unloading operations. Load may roll back causing death or serious injury.

WARNING

If tank engine has been running, warn personnel of extreme heat from the exhaust system. It can cause severe burns.

WARNING

At no time during the unloading operation should personnel be on the semitrailer bed.

NOTE: Use extreme caution when winching, and post crewmembers as guide (one on each side of the semitrailer). The winch operator must obey hand signals from the primary ground guide (left [drivers] side of the semitrailer). The guide on the right [passengers] side relays signals to the guide on the left side of semitrailer unless in an emergency situation. The ground guides will move rearward as the tank is moved rearward off the semitrailer. The ground guides will keep visual contact with each other and with the winch operator at all times.

g. Start winching operation.

(1) The ground guide signals the winch operator to slowly pay in the #2 winch cable to pull the tank rearward. As the #1 winch cable becomes snug, ground guide signals to stop the #1 winch. The ground guide then signals to pay out the #1 winch cable to put slack in it. The ground guide

then signals to slowly pay in the #2 winch cable to continue moving the tank rearward.

(2) This procedure is continued until the tank starts down the ramp. At this time the #2 winch cable has completed its work and is no longer needed.

(3) The ground guide directs the winch operator to continue paying out the #1 winch cable until the tank is on the ground and all tension is removed from the cable.

h. Stop winching operation.

i. Place chock blocks between tank's road wheel (one on each side of the tank) as a safety precaution.

(1) Remove the winch cable from the snatch blocks.

(2) Remove the winch cable from the "V" chain.

(3) Remove the "V" chain from the tank's left and right towing eye.

(4) Remove the chock blocks from the road wheel of the tank.

j. The operator takes up the cables while the crewmembers watch the drum to make sure the cables wind evenly on the drum without tangles, kinks, or twists. Cable coils should be tight and close together on the drum.

k. Operator directs the crew members to signal when enough slack has been taken up to prevent the cables from unwinding over the drum flanges when attached to the anchor. Operator stops the winch and directs the crewmembers to bolt the cable clevis to the anchor.

l. Disengage the winch controls.

m. Normal winch shutdown.

(1) Push the engine throttle control fully forward (away from the cab) to reduce the engine rpm.

(2) Disengage the PTO.

(3) Move the throttle release safety switch to the off position.

(4) Verify that the PTO/AUX throttle indicator light is off.

- (5) Move the main transmission range selector lever to the neutral (N) position. Ensure the parking brake is still applied and the auxiliary transmission selector lever is still in neutral. Winches are now shut down.

CAUTION

Allow the turbocharger to slow down, and allow both the turbocharger and the engine to cool. Run the engine at 800 to 1000 rpm at no load for 3 to 5 minutes before shutting down. The amount of cool down time needed will depend on how hard the engine was worked. Failure to cool may cause damage to the engine and/or turbocharger.

n. Preparing the semitrailer for travel.

- (1) Check that the air control handle is in the proper position for payload.
- (2) Check that the landing gear is raised and that the swingaway rollers are in the stowed position.
- (3) Check that the retractable clearance lights are in the retracted position for regular loads or are extended for all loads that are wider than the bed of the semitrailer.
- (4) Check that the ramps are raised and secured with the tie-down assemblies.
- (5) Check that all BII are stowed properly on the semitrailer.
- (6) Remove the support blocks from the rear of the semitrailer.
- (7) Use the towing vehicle controls and check that the semitrailer brakes and lights are operating.
- (8) Remove the chock blocks from the semitrailer wheels.

3. Practical exercise:

- a. Assign students to vehicles and issue TM 9-2320-270-10, TM 9-2330-294-14, TM 55-2350-255-14, pencils, DA Form 2404, DD Form 1970, and equipment records folder. Instruct students on the location of rags, lubricants, and coolant. See Chapter 4, Figure 4-5.
- b. Students perform before-operation PMCS on the tractor and semitrailer according to the appropriate operator's TMs.

4. Evaluate: Check each student's performance of PMCS and the procedures for unloading an M1 tank.

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 the vehicle is parked.
2. Always place the transmission in neutral, set the parking brake (except in extreme cold), and shut off the engine before leaving the vehicle.
3. Ensure students remove all jewelry and identification tags before performing PMCS.
4. Ensure students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Ensure that ground guides are always used when backing the vehicle.
6. Always wear hearing protection when working in or around a running vehicle.
7. Always wear heavy gloves when handling the cable. Never allow the cable to run through hands.
8. Ensure that all personnel not involved in the winching operation stand clear of the winch cables and payload.
9. Direct personnel not to walk behind the tank during the unloading operations. The load may roll back causing death or serious injury.
10. If the tank engine has been running, warn personnel of the extreme heat from the exhaust system. It can cause severe burns.
11. At no time during unloading operation should personnel be on the semitrailer bed.
12. Ensure that the winch operator and guides know the correct hand signals used in the winching operations.

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13. Use extreme caution when winching and post crewmembers as guides (one on each side of the semitrailer). The winch operator must obey hand signals from the primary ground guide on the left (drivers) side of the semitrailer. The guide on the right (passenger) side relays signals to the guide on the left side of the semitrailer unless in an emergency situation.

14. Never operate a winch at high speed when there is a load on the winch cable. High speed is intended for no-load operation only. Failure to follow this caution can result in equipment damage.

15. Never operate either winch with less than four wraps of cable on the drum.

16. Instruct operators as follows:

- a. Only one winch can be operated at a time in high speed.
- b. Both winches can be operated at the same time with full load in low speed.
- c. The winches will operate in the same direction or opposite directions at the same time in low speed.

17. Allow the turbocharger to slow down, and allow both the turbocharger and the engine to cool. Run the engine at 800 to 1000 rpm at no load for 3 to 5 minutes before shutting down. The amount of cool down time needed will depend on how hard the engine was worked. Failure to cool may cause damage to the engine and/or turbocharger.

18. Check the tire inflation on the tractor and semitrailer.

19. Get a slow moving sign for the rear of your vehicle with NSN 9905-01-057-3894. It's required by paragraph 3-13 of AR 385-30 for slow moving vehicles operating 25 mph or less on public highways in CONUS. Use Appendix A of CTA 50-970 as your authority to order it.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 4 hours (1 conference and 3 practical exercise includes .5 hour of PMCS).

Section II

End Of Course Comprehensive Test

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, a DD Form 1970, a DA Form 2404, a pencil, a TM 9-2320-270-10, TM 9-2330-294-14, TM 55-2350-255-14, an equipment records folder, rags, lubricants, coolant, a suitable training area, road test route, an M1 main battle tank, an M911 tractor with M747 semitrailer, and BII.

STANDARDS: Answer correctly 21 of 30 questions on the written examination, pass the driver's road test with a score of 70 or higher, and load/unload the M1 main battle tank and receive all Gos on the checklist.

B. INTERMEDIATE TRAINING.

Intermediate Training Objective 1

TASK: Pass a written examination.

CONDITION: Given an examination booklet and a pencil.

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

Intermediate Training Objective 2

TASK: Pass the driver's road test.

CONDITION: Given a DD Form 1970, a DA Form 2404, a pencil, TM 9-2320-270-10, TM 9-2330-294-14, TM 55-2350-255-14, an equipment records folder, rags, lubricants, coolant, road test route, an M1 main battle tank, an M911 tractor with M747 semitrailer, and BII.

STANDARDS: Achieve a score of 70 or higher. Use the driver's performance test (road test) instructions and the driver's road test checklist.

Intermediate Training Objective 3

TASK: Load/unload an M1 main battle tank onto/off the M747 semitrailer.

CONDITION: Given a DD Form 1970, a DA Form 2404, a pencil, TM 9-2320-270-10, TM 9-2330-294-14, TM 55-2350-255-14, an equipment records folder, rags, lubricants, coolant, suitable area for loading/unloading, an M1 main battle tank, an M911 tractor with an M747 semitrailer, and BII.

STANDARDS: Load/unload an M1 main battle tank onto/off an M747 semitrailer in the proper sequence, follow all safety precautions without damage to equipment or injury to personnel, and receive all Gos on the performance test checklist.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom, motor park, road test route, and training area as scheduled.
3. Training type: Performance evaluation.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the class for the written test, and one instructor for every student for the performance tests.
6. Training aids and equipment: Examination booklet, a DD Form 1970, a DA Form 2404, a pencil, rags, lubricants, coolant, TM 9-2320-270-10, TM 9-2330-294-14, TM 55-2350-255-14, an equipment records folder, an M1 main battle tank, an M911 tractor with M747 semitrailer, and BII.
7. References: TM 9-2320-270-10, TM 9-2330-294-14, TM 55-2350-255-14, DA Pamphlet 738-750, and FM 21-305.

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. Administer the written examination.
 - b. Administer performance tests. This will be accomplished by using the driver's performance test instructions and performance test checklists.
4. Evaluate: Check performance test checklists and written test results.
5. Summary:
- a. Recap main points.
 - b. Allow for questions.
 - c. Clarify questions.
 - d. Give closing statement.
6. Retraining: Retrain and retest No-Gos.

E. SAFETY RESTRICTIONS.

- 1. Ensure that all chock blocks are in place when the vehicles are parked.
- 2. Always place the transmission in neutral, set the parking brake, and shut off the engine before leaving the vehicle.
- 3. Ensure that students remove all jewelry and identification tags before performing PMCS.
- 4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.

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5. Always use ground guides when backing the tractor/semitrailer.
6. Maintain a safe following distance and speed limit when driving on the road test route (as determined by the local command and traffic control devices).
7. Always wear hearing protection when working in or around a running vehicle.
8. Ensure that all occupants wear seat belts while the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended testing time is 6 hours (.5 for the written test, 3 hours for the loading/unloading, and 2.5 hours for the road test).

INTERMEDIATE TRAINING OBJECTIVE 1

WRITTEN TEST (PRIMARY)

NAME

RANK

DATE

SECTION I. True/false questions: Read each question carefully and place a T or F on the blank line to the left.

- _____ 1. You may shift the inter-axle differential and transfer case control lever while the vehicle is moving.
- _____ 2. Damage to the tachograph stylus will result if you operate the vehicle without a disc in the tachograph.
- _____ 3. The main and auxiliary transmission has a neutral safety switch.
- _____ 4. It is all right to idle the engine for long periods of time.
- _____ 5. Long continuous use of the hydraulic retarder will raise the transmission oil temperature.
- _____ 6. Road, load, and traffic conditions are factors in determining the transmission gear selection.

SECTION II. Multiple choice: Read each question carefully and write the answer which is MOST correct on the blank line to the left.

- _____ 7. The low oil pressure/high water temperature warning light shows red when--
- The engine oil pressure is too high or when the engine water temperature is too low.
 - The engine oil pressure and water temperature is normal.
 - The engine oil pressure is too low or the engine water temperature is too high.
 - None of the above.
- _____ 8. The parking brake control is--
- Pulled out to apply the parking brakes.
 - Pushed in to release the parking brakes.
 - Pushed in to charge the trailer air system.
 - All of the above.

- _____ 9. The engine water temperature gauge should read _____ at normal operating temperature.
- a. 160° to 185°F.
 - b. 190° to 210°F.
 - c. 200° to 230°F.
 - d. 210°F to 240°F.
- _____ 10. At 1800-2100 rpm, the engine oil pressure should read--
- a. 50 to 70 psi.
 - b. 25 to 40 psi.
 - c. 30 to 50 psi.
 - d. 90 to 120 psi.
- _____ 11. The normal operating temperature of the main transmission oil temperature is--
- a. 120° to 160°F.
 - b. 160° to 180°F.
 - c. 160° to 220°F.
 - d. 220°F to 240°F.
- _____ 12. What is the purpose of the green and red needles on the air pressure gauge?
- a. Green shows front axle system air pressure.
 - b. Red shows rear axle system air pressure.
 - c. Green and red show the same thing.
 - d. Both a and b.
- _____ 13. The red air (low air pressure warning light) warning light will remain on and the buzzer will sound until--
- a. The brake pedal is applied.
 - b. The air system pressure in each section of the dual system exceeds 60 psi.
 - c. The air system pressure in each section of the dual systems exceeds 30 psi.
 - d. None of the above.
- _____ 14. The differential lock indicator will show red when the--
- a. Differential lock/unlock is in the unlock position.
 - b. Differential lock/unlock is in the lock position.
 - c. Driveline locking system is engaged.
 - d. Both b and c.

- _____ 15. The main transmission has _____ forward gear ranges.
- Five.
 - Seven.
 - Eight.
 - Nine.
- _____ 16. The auxiliary transmission has--
- Low range
 - Low, neutral, and high range.
 - High range.
 - None of the above.
- _____ 17. The hydraulic retarder--
- Helps slow the truck on downgrades or curves.
 - Has the greatest effect in the lowest transmission gear ranges.
 - Is not applied for long periods.
 - Is used only when the throttle is closed.
 - All the above.
- _____ 18. The trailer brake hand control is--
- Pulled down to apply trailer brakes only.
 - Used for testing semitrailer brakes.
 - Not used as a parking brake.
 - All of the above.
- _____ 19. After using the trailer brake hand control, return it to the OFF position--
- Or leave it in any position.
 - To prevent the trailer brakes from burning.
 - To prevent the transmission from over heating.
 - All the above.
- _____ 20. Do not accelerate the engine above low idle for _____ minutes after starting.
- Two.
 - Four.
 - Six.
 - Eight.

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- _____ 21. Do not go to full throttle until the water temperature gauge reads at least--
- a. 90°F.
 - b. 100°F.
 - c. 120°F.
 - d. 140°F.
- _____ 22. Low engine idle is _____ rpm and high engine idle is _____ rpm.
- a. 400, 600.
 - b. 500, 800.
 - c. 600, 1000.
 - d. High idle and low idle are the same.
- _____ 23. When should you NOT move the inter-axle differential and transfer case to the lock positions?
- a. While turning a corner.
 - b. If tires are slipping.
 - c. It can be shifted at any time.
 - d. Both a and b.
- _____ 24. Hearing protection is required when--
- a. Anywhere near the vehicle.
 - b. The vehicle is running and you are in the cab.
 - c. Using the winch and you are at the operator's station.
 - d. Both b and c.
- _____ 25. Do not operate the vehicle with the pusher axle lowered--
- a. During off-road operations.
 - b. Over rough roads.
 - c. Without a payload on the highway.
 - d. All of the above.
- _____ 26. With the main transmission in the 1 position and the auxiliary transmission in low range, you get the most--
- a. Pulling power.
 - b. Engine braking.
 - c. Hydraulic retarder effect.
 - d. All of the above.

- _____ 27. Never let your vehicle coast in neutral because--
- It will severely damage the transmission.
 - You lose engine braking.
 - You lose hydraulic retarder.
 - All of the above.
- _____ 28. Run the engine at _____ rpm at no load for 3 to 5 minutes before shutting the engine down.
- 500 to 700.
 - 600 to 800.
 - 700 to 900.
 - 800 to 1000.
- _____ 29. When coupled to an M747 semitrailer, the M911 must not have _____ between the fifth wheel plate and the fifth wheel.
- More than four inches of daylight.
 - More than six inches of daylight.
 - Daylight.
 - None of the above.
- _____ 30. The color of the emergency air hose is _____ and the color of the service air hose is _____.
- Red, orange.
 - Orange, blue.
 - Red, blue.
 - Blue, orange.

INTERMEDIATE TRAINING OBJECTIVE 1
WRITTEN TEST ANSWER SHEET (PRIMARY)

1.	F	11.	C	21.	D
2.	T	12.	D	22.	C
3.	T	13.	B	23.	D
4.	F	14.	D	24.	D
5.	T	15.	A	25.	D
6.	T	16.	B	26.	D
7.	C	17.	E	27.	D
8.	D	18.	D	28.	D
9.	A	19.	B	29.	C
10.	A	20.	A	30.	C

INTERMEDIATE TRAINING OBJECTIVE 1**WRITTEN TEST (ALTERNATE)****NAME****RANK****DATE**

SECTION I. True/false questions: Read each question carefully and place a T or F on the blank line to the left.

- _____ 1. The neutral safety switch will allow the engine to start while the main transmission is in any gear.
- _____ 2. It is all right to park the vehicle on a steep grade.
- _____ 3. The fifth wheel four-way oscillation is for off-road driving, and the front and rear oscillation is for highway driving.
- _____ 4. Heavy gloves are required when working with the winch cables.
- _____ 5. There is no throttle release safety switch mounted on the winch operator's station.
- _____ 6. Long continuous use of the hydraulic retarder will not raise the transmission oil temperature.

SECTION II. Multiple choice: Read each question carefully and write the answer which is MOST correct on the blank line to the left.

- _____ 7. What is the purpose of the green and red needles on the air pressure gauge?
- a. Green shows front axle system air pressure.
 - b. Red shows rear axle system air pressure.
 - c. Green and red show the same thing.
 - d. Both a and b.
- _____ 8. How many forward gears does the main transmission have?
- a. Five.
 - b. Seven.
 - c. Eight.
 - d. Nine.

- _____ 9. The hydraulic retarder--
- a. Helps slow the truck on downgrades or curves.
 - b. Has the greatest effect in the lowest transmission gear range.
 - c. Is not to be used for extended periods.
 - d. Is used only when the throttle is closed.
 - e. All of the above.
- _____ 10. When coupled to an M747 semitrailer, the M911 must have no _____ between the fifth wheel plate and the fifth wheel.
- a. More than four inches of daylight.
 - b. More than six inches of daylight.
 - c. Daylight.
 - d. None of the above.
- _____ 11. The trailer brake hand control is--
- a. Pulled down to apply trailer brakes only.
 - b. Used for testing the semitrailer brakes.
 - c. Not to be used as a parking brake.
 - d. All of the above.
- _____ 12. During normal driving conditions and at engine rpm range of 1800 to 2100 rpm, the oil pressure gauge should read--
- a. 20 to 50 psi.
 - b. 30 to 70 psi.
 - c. 50 to 90 psi.
 - d. 70 to 110 psi.
- _____ 13. Normal vehicle air system air pressure for driving is--
- a. 50 to 70 psi.
 - b. 70 to 90 psi.
 - c. 90 to 120 psi.
 - d. 110 to 150 psi.
- _____ 14. The maximum no load governed engine speed is--
- a. 2025 rpm.
 - b. 2125 rpm.
 - c. 2225 rpm.
 - d. 2325 rpm.

- _____ 15. Under a full load, the governed engine speed is--
- 1800 rpm.
 - 1900 rpm.
 - 2000 rpm.
 - 2100 rpm.
- _____ 16. Do not operate the vehicle with the pusher axle lowered--
- During off-road operations.
 - On rough roads.
 - Without a payload.
 - All of the above.
- _____ 17. What is the determining factor(s) in selecting the transmission gear range?
- Roads, loads, and traffic conditions.
 - Nothing specific.
 - Traffic conditions only.
 - None of the above.
- _____ 18. With the main transmission in one position and the auxiliary transmission in low, you get--
- The most pulling power.
 - The most engine braking.
 - The most hydraulic retarder.
 - All of the above.
- _____ 19. Never let your vehicle coast in neutral or you will--
- Severely damage the transmission.
 - Lose engine braking.
 - Lose hydraulic retarder braking.
 - All of the above.
- _____ 20. The parking brake control is--
- Pulled out to apply the parking brakes.
 - Pushed in to release the parking brakes.
 - Pushed in to charge the trailer air system.
 - All of the above.

- _____ 21. The red air (low air pressure warning light) will remain on and the buzzer will sound until--
- a. The brake pedal is pushed in.
 - b. The air system pressure in each section of the dual system exceeds 60 psi.
 - c. The air system pressure in each section of the dual system exceeds 30 psi.
 - d. None of the above.
- _____ 22. Do not accelerate the engine above the low idle for minutes after _____ starting.
- a. Two
 - b. Four
 - c. Six
 - d. Eight
- _____ 23. Hearing protection is required when--
- a. You are anywhere near the vehicle.
 - b. The vehicle is running and you are in the cab.
 - c. You are operating the winch at the winch operator's station.
 - d. Both b and c.
- _____ 24. When starting the engine and the water temperature warning light and buzzer come on, you should--
- a. Turn the ignition off.
 - b. Notify organization maintenance.
 - c. Continue the mission.
 - d. Both a and b.
- _____ 25. Long continuous use of the hydraulic retarder will _____ the transmission oil pressure.
- a. Raise.
 - b. Lower.
 - c. Stabilize.
 - d. None of the above.
- _____ 26. When stopping the vehicle with a load, you should _____ to assist you.
- a. Use the engine brake.
 - b. Downshift the main transmission.
 - c. Use the service brakes.
 - d. All of the above.

- _____ 27. The auxiliary transmission has--
- Low, neutral, and high range.
 - Low range.
 - High range.
 - None of the above.
- _____ 28. After using the trailer brake hand control, return it to the off position--
- Or leave it in any position.
 - To prevent the semitrailer brakes from overheating.
 - To prevent the transmission from overheating.
 - None of the above.
- _____ 29. In what gear do you start the engine?
- 1st.
 - 5th.
 - "P."
 - "N."
- _____ 30. Each winch is equipped with _____, which will stop and hold a payload when movement ceases.
- A drag bar.
 - A cable tightener.
 - An automatic safety switch.
 - A cable hook.

INTERMEDIATE TRAINING OBJECTIVE 1
WRITTEN TEST ANSWER SHEET (ALTERNATE)

1.	F	11.	D	21.	B
2.	F	12.	B	22.	A
3.	T	13.	C	23.	D
4.	T	14.	C	24.	D
5.	F	15.	D	25.	A
6.	F	16.	D	26.	D
7.	D	17.	A	27.	B
8.	A	18.	D	28.	B
9.	E	19.	D	29.	D
10.	C	20.	D	30.	C

INTERMEDIATE TRAINING OBJECTIVE 2**DRIVER'S PERFORMANCE TEST (ROAD TEST) INSTRUCTIONS****1. GENERAL**

a. The driver's performance test determines if an individual is proficient in operating a motor vehicle properly and safely under conditions of traffic and terrain where he is expected to drive. It serves as a basis for issuing an operator's permit. Furthermore, the test provides a means for instructional reinforcement and counseling. Driving weaknesses that may show up as the result of the test can be called to the examinee's attention and specific steps can be taken to eliminate them.

b. Final evaluations are recorded on DA Form 348 or on an equivalent official form.

c. The examiner will be a qualified heavy-equipment transporter operator. He will be familiar with the road test route and the testing procedures. Before administering the test to any examinees, he must practice administering the test to a regular licensed driver qualified on that type of vehicle. This practice administration will help him become acquainted with the test route and testing procedures.

2. TESTING METHOD

a. 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 instructions, which are indented and printed in large type, are read or spoken aloud to the examinees. When giving instructions aloud, give the instructions slowly and distinctly, making sure the examinees understand. The directions in regular type, including those in parentheses, are for the information of the examiner only and are not given aloud.

3. DIRECTIONS FOR ADMINISTERING THE ROAD TEST

a. Setting Standards. The standard road test is five miles long with traffic and terrain representing those areas in which the examinee is expected to drive. Approximately two miles of this route is in a more congested traffic area. Approximately one mile of the test route will be devoted to secondary road driving. Once a route is established (in a given locality), it should be used for all examinees who are to be tested. 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, remains the same. Every road test will meet the following requirements (to the extent possible):

(1) Five right turns.

(2) Five left turns.

- (3) Two intersections.
- (4) Two traffic lights or stop signs.
- (5) Two slow zones.
- (6) One railroad crossing.
- (7) Two steep upgrades.
- (8) Two steep downgrades.
- (9) One backing area of 100 feet with a clearly marked line extending for the length of the 50 feet. The additional 50 feet is for maneuvering the vehicle into position. The marked 50 feet is scored/graded area.

b. Giving Road Tests. The road test consists of a series of operations, which the examinee must perform. These operations are listed on the Driver's Road Test Checklist, which must be used in giving this test. Typical operations are starting the motor, pulling out, and parking.

c. Giving Instructions. Give instructions to perform an operation well in advance of that operation to allow the driver sufficient time to conform. In giving instructions, first tell the examinee where to perform the operation and then tell him what to do. For example, "At the corner two blocks from here, turn right." Notice that the location was given in terms of landmarks. This must always be done.

CAUTION

The driver must never be urged to do something which is unsafe or which he does not want to do. Such urging may lead to an accident.

d. Preventing Accidents

- (1) Road tests should normally **NOT** be given if road conditions present a hazard such as ice or rain. The exception is when testing is specifically for driving under such conditions.
- (2) You must be prepared to take control of the vehicle at a moment's notice. You must always watch traffic conditions and warn the examinee of dangers, which you think he does not see. If the driver becomes involved in a dangerous or unlawful moving traffic incident or an accident, the test is to be terminated immediately and the examiner will drive the vehicle back to the start point (once on-scene responsibilities are fulfilled).

e. Beginning the Road Test

(1) On the Driver's Road Test Checklist, enter the date in the appropriate place. Then say to the examinee--

WHAT IS YOUR NAME, LAST NAME FIRST, SPELL IT?

(2) Fill in the examinee's name after the word NAME, then say--

WHAT IS YOUR RANK?

(3) Enter the individual's RANK after the word RANK, then say--

WHAT IS YOUR ORGANIZATION?

(4) Enter the name of the organization after the word ORGANIZATION. Enter your name after the word EXAMINER (last name first). After the word VEHICLE, enter the model of vehicle used in the road test. Then say to the examinee--

THERE WILL BE NO "TRICK" ORDERS.

YOU WILL NOT BE ASKED TO DO ANYTHING IN VIOLATION OF THE LAW OR OF GOOD DRIVING PRACTICES.

YOUR SCORED TEST BEGINS WITH BEFORE-OPERATIONS PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS). (The examiner may stop the PMCS process when he is sure the examinee is knowledgeable in the PMCS procedures.)

FOLLOW MY INSTRUCTIONS. DRIVE PROPERLY AND SAFELY.

ARE THERE ANY QUESTIONS?

(5) Answer all questions except those pertaining to the scoring procedures; then say--

DURING THE TEST, I WILL MAKE SOME OBSERVATIONS AND KEEP NOTES; DO NOT BE CONCERNED. YOUR SCORED ROAD TEST STARTS NOW. ALL RIGHT, START YOUR MOTOR.

(6) Directions for each operations, such as "next block, turn left," are to be given one at a time in their proper sequence, as set up by the test route according to paragraph 3a, above.

4. SCORING THE ROAD TEST

a. Within each of the operations, which the examinee will be required to perform, there is a list of errors on the Driver's Road Test Checklist. Every time the examinee makes one of these errors under the specific operation, place a tally mark next to the error under that operation. For example, if the examinee fails to signal when leaving the curb, place a tally mark next to "fails to give proper signal" under the operation "Pulling Out" and nowhere else. The tally mark will be placed in the space to the left of the specific error. Since an individual will be required to repeat some of the operations, such as right turns, a number of times, more than one tally mark can be placed next to the same error under a given operation. Some test routes do not lend themselves to all operations indicated on the checklist. In these cases, score only the operations that apply.

b. At the completion of the test, count the number of tally marks and subtract this number from 100 to obtain the examinee's score. Record the score in the space provided on the checklist.

c. The lowest passing score is 70. If the examinee does not achieve 70 or above, the reason for failure will be indicated in the space provided under REMARKS; for example, "Examinee did not obtain minimum passing score" or "Examinee exhibited undue nervousness."

d. Automatic Failures

- (1) Any unsafe driving act.
- (2) Failure to properly perform PMCS.
- (3) Not knowing location and function of gauges and controls.
- (4) Undue nervousness.
- (5) Failure to achieve minimum passing score.
- (6) If an individual scores 70 or higher on the road test and, in the opinion/judgment of the test examiner the examinee needs additional training, he has the right not to issue a license.

5. AFTER-ACTION REVIEW (AAR). Weakness exhibited by the examinee in the test will be brought to his attention, and he will be advised in what areas he needs further practice or training. The counseling will be accomplished whether the examinee passes or fails the road test. After the examinee has received additional training, he will be retested. An examinee that fails the road test must retake the entire road test.

INTERMEDIATE TRAINING OBJECTIVE 2

DRIVER'S ROAD TEST CHECKLIST

NAME _____ RANK _____ DATE _____ VEHICLE _____

ORGANIZATION _____ EXAMINER _____

BEFORE STARTING ENGINE

FAILS TO --

- _____ Ensure vehicle is properly dispatched
- _____ Sign DD Form 1970 and/or other forms as required.
- _____ Perform before-operations maintenance checks and services (PMCS) using appropriate -10 manual.
- _____ Unchock wheels and stow chock blocks (as required).
- _____ Adjust all mirrors.
- _____ Adjust seat.
- _____ Fasten seat belt/safety restraint.

STARTING ENGINE

FAILS TO --

- _____ Ensure proper gear selection, such as neutral.
- _____ Warm engine properly.
- _____ Check to ensure all gauges are functioning properly.
- _____ Ensure there is adequate air pressure (as required).

PULLING OUT

FAILS TO --

- _____ Select proper gear.
- _____ Release parking brakes.
- _____ Look back and check traffic (use mirrors and windows).
- _____ Give proper signal.
- _____ Allow traffic to pass.
- _____ Make a smooth start.
- _____ Check all gauges periodically.
- _____ Maintain adequate air pressure (as required).
- _____ Check mirrors periodically.
- _____ Keep both hands on steering wheel (except as required by driving needs).

DRIVING IN TRAFFIC (SPEED)

FAILS TO --

- _____ Stay within the speed limits.
- _____ Reduce speed when required by road conditions.
- _____ Maintain adequate speed (drives too slow).
- _____ Maintain constant speed as much as possible (feeds gas erratically).
- _____ Maintain proper speed for gear selection.
- _____ Reduce speed when required by traffic conditions.
- _____ Check all gauges periodically.
- _____ Maintain adequate air pressure (as required).
- _____ Check mirrors periodically.
- _____ Keep both hands on steering wheel (except as required by driving needs).

DRIVING IN TRAFFIC (ATTENTION, ATTITUDE)

FAILS TO --

- _____ Stay in proper lane.
- _____ Maintain proper following distance from vehicle ahead in traffic (twice the speedometer reading in feet).
- _____ Maintain proper following distance at high speeds (40 mph or over) from vehicle ahead on open highways (two times the speedometer reading in yards).
- _____ Anticipate action of other drivers and pedestrians.
- _____ Observe and obey signs, signals, and/or police officers.
- _____ Give necessary warning (sound horn).
- _____ Yield right-of-way to other vehicles.
- _____ Yield right-of-way to pedestrians.
- _____ Be courteous toward other drivers.
- _____ Slow down when approaching railroad grade crossings.
- _____ Stop, look, and listen both ways before entering railroad grade crossings.
- _____ Prevent creeping or drifting when stopped.
- _____ Perform during-operations maintenance.
- _____ Check all gauges periodically.
- _____ Check mirrors periodically.
- _____ Maintain adequate air pressure (as required).
- _____ Keep both hands on steering wheel (except as required by driving needs).

LEFT TURN

FAILS TO --

- _____ Give proper signal in advance.
- _____ Turn from proper lane (usually adjacent to centerline).
- _____ Turn into proper lane (usually immediately to the right of the centerline).
- _____ Avoid cutting corners.
- _____ Maintain safe speed.
- _____ Straighten out properly.

- _____ Check mirrors periodically.
- _____ Maintain adequate air pressure (as required).
- _____ Keep both hands on steering wheel (except as required by driving needs).

RIGHT TURN

FAILS TO --

- _____ Give proper signal in advance.
- _____ Turn from proper lane (usually the right lane).
- _____ Turn into proper lane (usually the right lane).
- _____ Avoid swinging too wide.
- _____ Maintain safe speed.
- _____ Avoid cutting corners.
- _____ Straighten out properly.
- _____ Check mirrors periodically.
- _____ Maintain adequate air pressure (as required).
- _____ Keep both hands on steering wheel (except as required by driving needs).

USE OF CONTROLS

FAILS TO --

- _____ Use proper shifting patterns (upshifting and downshifting).
- _____ Avoid racing engine.
- _____ Start on hill without rolling back.
- _____ Keep both hands on steering wheel (except as required by driving needs).
- _____ Check all gauges periodically.
- _____ Maintain engine speed of 1400 to 1600 rpm (city) and 1650 to 1850 (highway).

SLOWING OR STOPPING

FAILS TO --

- _____ Signal intent in advance.
- _____ Check mirrors and windows.
- _____ Brake smoothly.
- _____ Use engine as a brake.
- _____ Use hydraulic retarder (transmission).
- _____ Use brakes in proper sequence (engine and wheel).
- _____ Observe traffic to the rear (use mirrors and windows).
- _____ Maintain adequate air pressure (as required).
- _____ Keep both hands on steering wheel (except as required by driving needs).

OVERTAKING AND PASSING

FAILS TO --

- _____ Check for other traffic (use mirrors and windows).
- _____ Signal in advance.
- _____ Maintain proper following distance before passing.
- _____ Pass in proper lane.

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- _____ Change lane gradually in passing.
- _____ Return to proper lane only after signaling intent and ensuring that lane is clear.
- _____ Obey "no passing" signs, rules, or regulations (such as hills, curves, and intersections).
- _____ Check mirrors periodically.
- _____ Maintain adequate air pressure (as required). Check all gauges periodically.
- _____ Keep both hands on steering wheel (except as required by driving needs).

BACKING

FAILS TO --

- _____ Look behind vehicle before backing.
- _____ Sound horn.
- _____ Back slowly.
- _____ Back smoothly.
- _____ Back in a straight line using mirrors and ground guide (50 feet within six inches of line laterally).
- _____ Maintain adequate air pressure (as required).
- _____ Keep both hands on steering wheel (except as required by driving needs).

PARKING

FAILS TO --

- _____ Check for other traffic.
- _____ Give proper signal for traffic to pass.
- _____ Park within two attempts.
- _____ Park without bumping or scraping curb.
- _____ Park in space three feet wider than test vehicle (angle parking).
- _____ Set parking brakes.
- _____ Chock wheels.
- _____ Perform after-operation PMCS.
- _____ Keep both hands on steering wheel (except as required by driving needs).

ROAD TEST SCORE

100

NUMBER OF TALLY MARKS (SUBTRACT)

ROAD TEST SCORE

REMARKS:

INTERMEDIATE TRAINING OBJECTIVE 3

CHECKLIST FOR LOADING AN M747 SEMITRAILER

NAME _____ **RANK** _____ **UNIT** _____

EVALUATOR _____ **DATE** _____

PERFORMANCE STEPS

GO NO-GO

1. Preparation of tractor by operator.		
a. Applies parking brakes.		
b. Moves main transmission to neutral.		
c. Moves auxiliary transmission to neutral.		
d. Moves power take-off control to the engage position.		
e. Places main transmission in the D position.		
f. Adjusts pusher axle.		
g. Checks the PTO/AUX throttle indicator light		
2. Preparation of semitrailer by crew members.		
a. Chock wheels on semitrailer.		
b. Install support blocks under each rear corner of semitrailer.		
c. Correctly position air control handle.		
d. Disconnect ramp tie-down chains and lower ramps to the ground.		
e. Remove safety warning light.		
f. Remove all load binders, chains, curbing, clamps, and hemp rope from storage compartment.		
g. Unwind hemp (reeving) rope and position on semitrailer.		
3. Procedures prior to winching by operator and crew members.		
a. Crew members disconnect winch cable clevises from anchors on truck body.		
b. Operator moves winch control panel throttle release safety to the ON position.		
c. Operator pulls engine throttle as far back as it will go. Main transmission will shift through its 2 to 5 range.		
d. Operator checks instrument panel tachograph. Tachograph should stabilize at about 2200 rpm.		

PERFORMANCE STEPS

GO NO-GO

e. Crew members attach snatch blocks to tanks left and right towing eyes.		
f. Crew members thread cables through gooseneck rollers and anchor cable ends to gooseneck. Then walk straight from winch station to rear of semitrailer (do not cross winch cables).		
g. Crew members place and secure loops of cable in snatch blocks.		
h. Operator takes up slack in winch cables.		
i. Crew members signal when slack is out of winch cables.		
4. Operator starts winching operation.		
5. Operator stops winching operation.		
6. Crew members ensure rigging on tank is secure and the tank is aligned with approach ramps.		
7. Operator continues winching operation until rear of tank clears the approach ramps and curbing at position F.		
8. Operator stops winching operation.		
9. Crew members place chock blocks between tank's road wheels (one on each side of tank).		
10. Crew members move curbing from position F to position A		
11. Crew members remove chock blocks.		
12. Operator continues winching operation.		
13. Crew members signal the operator when the tank is approximately three feet from the gooseneck bumpers.		
14. Operator stops winching operations.		
15. Crew members do the following:		
a. Place chock blocks between the tank's road wheels (one on each side).		
b. Direct the operator to release tension on the winch cables.		
c. Remove winch cables from the snatch blocks.		
d. Remove snatch blocks from the tank's left and right towing eyes.		
e. Connect winch cables to the tank's left and right towing eyes.		
f. Remove chock blocks from the tank's road wheels.		
16. Operator continues winching until the tank is snug against the gooseneck bumpers.		

**INTERMEDIATE TRAINING OBJECTIVE 3
CHECKLIST FOR UNLOADING AN M747 SEMITRAILER**

NAME _____ **RANK** _____ **UNIT** _____

EVALUATOR _____ **DATE** _____

PERFORMANCE STEPS	GO	NO-GO
1. Preparation of tractor by the operator.		
a. Applies the parking brakes.		
b. Moves main transmission to neutral.		
c. Moves auxiliary transmission to neutral.		
d. Moves power take-off control to the engage position.		
e. Places main transmission in the D position.		
f. Checks the PTO/AUX throttle indicator light.		
2. Preparation of semitrailer by crewmembers.		
a. Chock wheels on semitrailer.		
b. Install support blocks under each rear corner of semitrailer.		
c. Disconnect ramp tie-down chains and lower ramps to ground.		
d. Remove safety warning light.		
e. Ensure retractable clearance lights are in the correct position.		
3. Procedures prior to and during winching operations by operator and crew members.		
a. Crew members disconnect winch cable clevises from anchors on truck body.		
b. Operator moves winch control panel throttle release safety to the ON position.		
c. Operator pulls engine throttle as far back as it will go. Main transmission will shift through its 2 to 5 range.		
d. Operator checks instrument panel tachograph. Tachograph should stabilize at about 2200 rpm.		
e. Crew members place chock blocks between tanks road wheels (one on each side).		
f. Crew members connect "V" chain to the front towing eyes of the tank.		

--	--

PERFORMANCE STEPS

GO NO-GO

z. Crew members will ensure that the rigging is safe and secure and then move to their positions.		
aa. Ground guide signals the winch operator to slowly pay in the #2 winch cable to pull the tank rearward. As the #1 winch cable becomes snug, ground guide signals to stop the #1 winch. The ground guide signals to pay out the #1 winch cable to put slack in it. Ground guide signals to slowly pay in the #2 winch cable to continue moving the tank rearward.		
bb. This procedure is continued until the tank starts down the ramps. At this time the #2 winch is no longer needed.		
cc. Ground guide directs winch operator to continue paying out the #1 winch cable until the tank is on the ground and all tension is removed from the cables.		
dd. Ground guide directs winch operator to stop winching operations.		
ee. Crew members place chock blocks between tank's road wheels.		
ff. Crew members remove winch cables from snatch blocks.		
gg. Crew members remove winch cable from "V" chain.		
hh. Crew members remove "V" chain from the tanks left and right towing eyes.		
ii. Crew members remove chock blocks from between the tank's road wheels.		
4. Winch shut down procedures.		
a. Crew members keep cables taut as the operator is taking it in.		
b. Crew members ensure cables are wrapped evenly on drums without tangles, kinks, or twist. Cable coils should be tight and close together.		
c. Crew members attach cables to cable clevis and signal operator to take up slack and watch to prevent cables from unwinding over the drum flanges.		
5. The winch operator does the following:		
a. Disengages the winch controls.		
b. Pushes engine throttle control fully forward (away from cab) to reduce the engine rpm.		
c. Disengages PTO.		
d. Moves throttle release safety switch to the OFF position.		

CHAPTER 6**LIGHT-EQUIPMENT TRANSPORTER M916 AND
MEDIUM-EQUIPMENT TRANSPORTER M920****PURPOSE**

The material contained in this chapter provides uniform training and testing for the light- and medium-equipment transporter operator. It was designed specifically for the M916/M172A1 and M920/M870 tractor/semitrailer combination.

OBJECTIVE

The objective of this training is to provide a course that will qualify individuals destined to become light- and medium- equipment transport operators to safely operate and care for the vehicles.

TRAINING

Section I contain lessons compiled to assist instructors in scheduling and presenting the prescribed instruction. The number of students to be trained during one session is limited only by the number of instructors and vehicles available for training.

TESTING

Section II contains the performance tests and written examinations that must be used to qualify an individual on these vehicles. Students that do not pass the EOCCT must be given additional training and testing. Students will be issued an operator's permit (OF 346 or SF 46) only after passing the EOCCT.

Section I

Lesson Outlines

LESSON TITLE: USE TECHNICAL MANUALS (TMs) AND LUBRICATION ORDERS (LOs) AND MAKE ENTRIES ON DA FORM 2404

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

A. TRAINING OBJECTIVE.

TASK: Use the vehicle operator's TM, LO, and semitrailer operator's TM and make operator entries on DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

CONDITION: In a classroom environment, given instruction, DA Form 2404, a practical exercise, TM 9-2320-273-10, LO 9-2320-273-12, and the semitrailer operator's manual (TM 5-2330-360-14P for the M870 or TM 9-2330-211-14P for the M172A1).

STANDARDS: Locate information in the TM/LO and make the required operator entries on DA Form 2404 in correct sequence according to DA Pamphlet 738-750. Each student has 30 minutes to complete the practical exercise without error and will be graded on a Go/No-Go basis.

B. INTERMEDIATE TRAINING.

Intermediate Training Objective 1

TASK: Use the vehicle operator's TM and LO.

CONDITION: In a classroom environment, given instruction, a practical exercise, TM 9-2320-273-10, and LO 9-2320-273-12.

STANDARDS: Answer the questions in the practical exercise by locating information in the TM/LO. Each student will be graded on a Go/No-Go basis.

Intermediate Training Objective 2

TASK: Use the semitrailer operator's TM.

CONDITION: In a classroom environment, given instruction, a practical exercise

and TM 5-2330-360-14P for the M870 or TM 9-2330-211-14P for the M172A1.

STANDARDS: Answer the questions in the practical exercise by locating information in the TM. Each student will be graded on a Go/No-Go basis.

Intermediate Training Objective 3

TASK: Document a no-fault situation on DA Form 2404.

CONDITION: In a classroom environment, given instruction, a DA Form 2404, a practical exercise, TM 9-2320-273-10, and the semitrailer operator's manual (TM 5-2330-360-14P for the M870 or TM 9-2330-211-14P for the M172A1).

STANDARDS: You must fill out a no fault situation on DA Form 2404 in the correct sequence according to DA Pamphlet 738-750. Each student will be graded on a Go/No-Go basis.

Intermediate Training Objective 4

TASK: Document a fault situation on DA Form 2404.

CONDITION: In a classroom environment, given instruction, a DA Form 2404, a practical exercise, TM 9-2320-273-10, and the semitrailer operator's manual (TM 5-2330-360-14P for the M870 or TM 9-2330-211-14P for the M172A1).

STANDARDS: You must fill out a fault situation on DA Form 2404 in the correct sequence according to DA Pamphlet 738-750. Each student will be graded on a Go/No-Go basis.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom as scheduled.
3. Training type: Conference and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one assistant instructor for every 20 students for the practical exercise.

TC 21-305-5

6. Training aids and equipment: Overhead projector, screen, transparency, DA Form 2404 (4 per student), a practical exercise situation sheet (1 per student), TM 9-2320-273-10, LO 9-2320-273-12, and TM 5-2330-360-14P for the M870 or TM 9-2330-211-14P for the M172A1 (one set of references per student).

7. References: DA Pamphlet 738-750, TM 9-2320-273-10, LO 9-2320-273-12, and TM 5-2330-360-14P for the M870 or TM 9-2330-211-14P for the M172A1.

D. SEQUENCE OF ACTIVITY.

NOTE: Before class arrival, ensure that each student desk or table has four DA Forms 2404 and one each per student of the operator's manuals and LOs.

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. Proper technique for using the vehicle operator's TM.
 - (1) Front cover table of contents and tabbed index.
 - (2) Cautions and warnings.
 - (3) PMCS tables.
 - (4) Alphabetical index.
- b. Use of the vehicle LO.
 - (1) Tables and notes.
 - (2) Level of maintenance codes.

(3) Lubrication after fording and high-pressure washing.

(4) Lubricant abbreviations and intervals.

c. Use of the semitrailer operator's TM.

(1) Front cover table of contents and thumb tab subject index.

(2) PMCS tables.

(3) Lubrication chart.

(4) Alphabetical index.

(5) Troubleshooting chart.

d. DA Form 2404 no-fault situation:

NOTE: Explain to the students that separate DA Forms 2404 must be maintained--one for the tractor and one for the semitrailer.

(1) Organization.

(2) Nomenclature and model.

(3) Registration/serial number/NSN.

(4) Type of inspection (PMCS).

(5) TM number and TM date.

(6) Date of inspection (column c).

(7) Type of inspection (entered in column d when used for concurrent inspections).

(8) Disposition of DA Form 2404.

e. DA Form 2404 fault situation:

NOTE: Explain to the students that when a DA Form 2404 has previous no fault daily annotations, a new form does not have to be initiated when a fault must be annotated. Tell them to use the same form and that some of the steps listed below would already be completed.

- (1) Organization.
- (2) Nomenclature and model.
- (3) Registration/serial number/NSN.
- (4) Miles.
- (5) Hours.
- (6) Date.
- (7) Type of inspection (PMCS).
- (8) TM number and TM date.
- (9) Signature and rank in block 8a.
- (10) TM item number entered in column a. Circle item number if fault makes equipment not mission capable (NMC).
- (11) Status symbol entered in column b.
- (12) Deficiencies or shortcomings entered in column c.
- (13) Disposition of DA Form 2404.

3. Practical exercise: Hand out one practical exercise and four DA Forms 2404 to each student. Students will complete practical exercise as outlined in paragraph 2 above within 30 minutes.

4. Evaluate: Check each student's practical exercise.

5. Summary:

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

6. Retraining: Retrain and retest No-Gos. No-Gos will be retrained and retested after normal duty hours.

E. SAFETY RESTRICTIONS. None.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 1.5 hours (1.0 conference and .5 practical exercise).

EQUIPMENT INSPECTION AND MAINTENANCE WORKSHEET										
For use of this form, see OA FAM 738-750 and 738-751; the proponent agency is OCSLOG										
1. ORGANIZATION 321st Armor Co					2. NOMENCLATURE AND MODEL TRK Trac Light Equip Transporter M916					
3. REGISTRATION/SERIAL/NSN 04RCP429		4. MILES	5. HOURS	6. ROUNDS FIRED	7. HOT STABS	8. DATE	9. TYPE INSPECTION PMCS			
7. APPLICABLE REFERENCE										
TM NUMBER 9-2320-273-10 w/c 4		TM DATE May 80		TM NUMBER			TM DATE			
COLUMN a - Enter TM item number.				COLUMN d - Show corrective action for deficiency or shortcoming listed in Column c.						
COLUMN b - Enter the applicable condition status symbol.				COLUMN e - Individual ascertaining completed corrective action initial in this column.						
COLUMN c - Enter deficiencies and shortcomings.										
STATUS SYMBOLS										
"X"-Indicates a deficiency in the equipment that places it in an inoperable status.					DIAGONAL ("/)-Indicates a materiel defect other than a deficiency which must be corrected to increase efficiency or to make the item completely serviceable.					
CIRCLED "X"-Indicates a deficiency, however, the equipment may be operated under specific limitations as directed by higher authority or as prescribed locally, until corrective action can be accomplished.					LAST NAME INITIAL IN BLACK, BLUE-BLACK INK, OR PENCIL-Indicates that a completely satisfactory condition exists.					
HORIZONTAL DASH ("-")-Indicates that a required inspection, component replacement, maintenance operation check, or test flight is due but has not been accomplished, or an overdue MWO has not been accomplished.					FOR AIRCRAFT-Status symbols will be recorded in red.					
ALL INSPECTIONS AND EQUIPMENT CONDITIONS RECORDED ON THIS FORM HAVE BEEN DETERMINED IN ACCORDANCE WITH DIAGNOSTIC PROCEDURES AND STANDARDS IN THE TM CITED HEREON.										
8a. SIGNATURE (Person(s) performing inspection)				8b. TIME		8c. SIGNATURE (Maintenance Supervisor)		8d. TIME		8e. MANHOURS REQUIRED
TM ITEM NO.	STATUS	DEFICIENCIES AND SHORTCOMINGS			CORRECTIVE ACTION			INITIAL WHEN CORRECTED		
		1 Mar 91						RB		
		4 Mar 91						RB		
		5 Mar 91						RB		
		6 Mar 91			w			RB		
		7 Mar 91						RB		
		8 Mar 91						RB		
		11 Mar 91						RB		
		12 Mar 91						RB		
		13 Mar 91			w/m			RB		

NOTE: This is a sample DA Form 2404 used for operator/crew PMCS when no faults are found. All entries are to be completed in pencil. This sample can be used to make a transparency for overhead projection system.

EQUIPMENT INSPECTION AND MAINTENANCE WORKSHEET									
For use of this form, see DA PAM 738-750 and 738-751; the proponent agency is OCSLOG									
1. ORGANIZATION 32 ND Engineer Co					2. NOMENCLATURE AND MODEL Semi-trailer loaded M879 40 TON				
3. REGISTRATION/SERIAL/NSN DIRNP 717		4. MILES	5. HOURS	6. ROUNDS FIRED	7. HOT STARTS	8. DATE 29 Mar 91		9. TYPE INSPECTION PMCS	
7. APPLICABLE REFERENCE									
TM NUMBER 5-2330-360-144P			TM DATE Dec 84		TM NUMBER			TM DATE	
COLUMN a - Enter TM item number.					COLUMN d - Show corrective action for deficiency or shortcoming listed in Column c.				
COLUMN b - Enter the applicable condition status symbol.					COLUMN e - Individual ascertaining completed corrective action initial in this column.				
COLUMN c - Enter deficiencies and shortcomings.									
STATUS SYMBOLS									
"X" - Indicates a deficiency in the equipment that places it in an inoperable status.					DIAGONAL "(/)" - Indicates a materiel defect other than a deficiency which must be corrected to increase efficiency or to make the item completely serviceable.				
CIRCLED "X" - Indicates a deficiency, however, the equipment may be operated under specific limitations as directed by higher authority or as prescribed locally, until corrective action can be accomplished.					LAST NAME INITIAL IN BLACK, BLUE-BLACK INK, OR PENCIL - Indicates that a completely satisfactory condition exists.				
HORIZONTAL DASH "-" - Indicates that a required inspection, component replacement, maintenance operation check, or test flight is due but has not been accomplished, or an overdue MWO has not been accomplished.					FOR AIRCRAFT - Status symbols will be recorded in red.				
ALL INSPECTIONS AND EQUIPMENT CONDITIONS RECORDED ON THIS FORM HAVE BEEN DETERMINED IN ACCORDANCE WITH DIAGNOSTIC PROCEDURES AND STANDARDS IN THE TM CITED HEREON.									
8a. SIGNATURE (Person(s) performing inspection)				8b. TIME		9a. SIGNATURE (Maintenance Supervisor)		9b. TIME	10. MANHOURS REQUIRED
Rearing Legendy				SGT					
TM ITEM NO.	STATUS	DEFICIENCIES AND SHORTCOMINGS			CORRECTIVE ACTION			INITIAL WHEN CORRECTED	
④ X		INNER TIRE REAR Left axle flat and spare tire MISSING							
⑨ X		Brakes do not operate properly							

DA FORM 2404
1 APR 79

Replace edition of 1 Jan 64, which will be used

NOTE: This is a sample DA Form 2404 used for operator/crew PMCS when faults are found. All entries are to be completed in pencil. This sample can be used to make a transparency for overhead projection system.

PRACTICAL EXERCISE

LESSON TITLE: USE TECHNICAL MANUALS (TMs) AND LUBRICATION ORDERS (LOs) AND MAKE ENTRIES ON DA FORM 2404

NAME _____ RANK _____ DATE _____

To complete this practical exercise you will need the vehicle operator's TM, LO, semitrailer operator's manual, four blank DA Forms 2404, and a pencil. You have 30 minutes to complete this practical exercise.

FIRST REQUIREMENT

Using the vehicle operator's TM, LO, semitrailer operator's manual, answer the following questions by writing your answer in the space provided after each question.

1. At what interval does the operator check the transmission for proper operation?

2. Where would you find the definition for the different classes of leaks?

3. In what section of the operator's TM would you find the BII authorized for the tractor?

4. In what paragraph of the operator's TM would you find instructions for correct braking procedures?

5. What type of lubricant is used for the tail rotor?

6. In what publication did you find the answer to question 5 above?

7. At what maintenance interval do you drain the semitrailer air tanks?

8. At what maintenance interval(s) do you check the operation of the semitrailer air brakes?

SECOND REQUIREMENT

From the following information, make the required operator entries on DA Form 2404.

You are assigned to the 223d Mess Kit Repair Company as the operator of an M920 vehicle with registration number 2IF7H0000 and an M870 semitrailer with a registration number 2XP24045.

- a. On 17 December 1990, you perform a daily PMCS and find no faults on the tractor or semitrailer.

- b. On 18 December 1990, you perform a daily PMCS and again find no faults on either the tractor or semitrailer.

- c. On 19 December 1990, you perform a daily PMCS and your vehicle air pressure gauge (rear) reads less than 40 PSI. Your odometer reading is 2845 miles.

- d. On 20 December 1990, you perform a daily PMCS and you find your air pressure gauge has been repaired. No other faults are discovered on the tractor. The semitrailer lights are not operating. Make the appropriate entries.

- e. On 21 December 1990, you perform a weekly PMCS and find no faults.

LESSON TITLE: OBSERVE SAFETY RULES AND PROCEDURES FOR DRIVING UNDER ADVERSE ROAD CONDITIONS

TASK NUMBER: 551-721-1369 (Drive vehicle with semitrailer on snow/ice) and 551-721-1370 (Drive vehicle with semitrailer in sand)

A. TRAINING OBJECTIVE.

TASK: Demonstrate knowledge of procedures for driving under adverse conditions (snow, ice, mud, and sand).

CONDITION: Given instruction, a classroom, and a practical exercise.

STANDARDS: Answer 6 of 9 questions correctly on the practical exercise within 15 minutes.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom as scheduled.
3. Training type: Conference and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one assistant instructor for every 20 students for the practical exercise.
6. Training aids and equipment: Overhead projector, screen, transparency, and a practical exercise (1 per student).
7. References: TM 9-2320-273-10 and LO 9-2320-273-12.

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. General procedures:

- (1) Make sure each tire has a valve cap.
- (2) Check the engine and transmission temperature and engine oil pressure frequently.
- (3) If the truck overheats, stop and find out why.
- (4) Clean accumulations of sand and dirt from around any fluid filler locations before checking or adding fluids.
- (5) Clean spouts of fuel containers and areas around filler caps on fuel tanks before adding fuel. Under extremely sandy or dusty conditions, filter fuel when filling the tanks.
- (6) In cold temperatures, when parking the truck overnight or for any extended period, park so the rear of the truck faces toward the wind, or cover the radiator and all window glass with canvas.
- (7) On the M920 tractor, relieve the air pressure on the pusher axle and raise the pusher axle. This will increase traction by shifting weight to the driving axles.
- (8) In areas where the ground surface provides poor traction, move the differential lock/unlock control lever to the lock position. Disengage differential lockup when conditions are back to normal.

CAUTION

Do not lock differentials while vehicle is moving. Damage to drive train may result.

b. Driving in sand:

- (1) Maintain steady, even movement with the transmission in the lower gear ranges. Try to keep the truck moving without straining the engine and power train.
- (2) If stuck, adjust the tire pressure to gain additional traction. Reduce pressure in the front tires to 50 psi and reduce pressure in the rear tires to 45 psi. After the truck is out, inflate all tires to normal pressure.
- (3) If the truck bogs down even with tire pressure reduced, shovel a clear path ahead of each tire and place boards, brush, canvas, or similar materials under and in front of tires.
- (4) If these efforts fail and it becomes evident that the truck cannot be freed under its own power, use the winch, if possible, or have another vehicle tow the truck out.
- (5) Steer the vehicle straight up and down hills if possible.
- (6) Do not straddle sand mounds or drive on the sides of two sand mounds. Loose sand will not support the vehicle on steep slopes.
- (7) Keep the accelerator pedal steady after the vehicle reaches the desired speed.
- (8) Turn the vehicle slowly when on loose sand.
- (9) Clean, inspect, and lubricate moving parts more often than in usual conditions (see LO 9-2320-273-12).

c. Driving in mud or other soft surfaces:

- (1) Check the conditions before entering, and select the transmission gear range that you judge appropriate to get the truck through the area. Enter the soft area at a medium speed for the gear range you have selected.
- (2) Maintain a steady pressure on the accelerator pedal to keep your truck rolling until you reach solid ground again. Do not accelerate to the point of spinning the wheels.
- (3) If the truck gets stuck, place boards, brush, or similar materials under tires to provide traction and pull out slowly in a low gear.
- (4) If the truck is not coupled to a trailer, the winch may be used to help pull the truck out.

d. Driving in snow, on ice, and other slippery surfaces:

- (1) Accelerate slowly to avoid spinning the tires.
- (2) Drive at slower speeds.
- (3) Give signals sooner.
- (4) Pump the brakes to help avoid skidding and to give early warning of intention to stop.
- (5) Maintain double the normal distance from the vehicle ahead.
- (6) Keep the windshield, windows, mirrors, headlights, stoplights, and main body lights clean and clear of mud, snow, and ice.
- (7) Go down medium grades in a gear range normally used to climb the same grade. On steep or very slippery grades, use at least one gear range lower and lock the differential. The engine retarder (Jacobs brake) is used only on downgrades and curves and has the greatest effect in the lowest transmission gear ranges. Do not use the engine retarder if the tractor wheels do not have good traction.

WARNING

Use of the engine retarder on slippery surfaces can cause personal injury or death.

- (8) After driving through slush or water, drive slowly and put enough pressure on the service brake pedal to cause a slight drag. When heat from the dragging brakes has dried them, release the brake pedal and go back to normal driving.
- (9) Stop and inspect a difficult section of road before driving on it. Select the transmission gear best suited for the road, lock the differential, and then continue.
- (10) If the tires start spinning and forward motions stops, back up and try again. It may be necessary to rock the vehicle by shifting to a forward range, accelerating lightly, and shifting to reverse again when forward motion stops, and then back to a forward range (do not shift to reverse and back to a forward range while vehicle is in motion). Try not to spin the tires.
- (11) If the rear of vehicle skids, do the following:
 - (a) Let up on the accelerator pedal.

- (b) Steer in the same direction in which the rear of the vehicle is skidding.
 - (c) When the vehicle is under control, press the brake pedal lightly.
 - (d) Steer the vehicle on a straight course and slowly press the accelerator pedal.
- (12) If the vehicle starts to slide while climbing a hill, do the following:
- (a) Let up on the accelerator pedal.
 - (b) Steer the vehicle in the direction of slide until the vehicle stops.
 - (c) Slowly press the accelerator pedal and steer the vehicle on a straight course.
- (13) When stopping on snow and ice, do the following:
- (a) Ease up on the accelerator and leave the transmission in gear.
 - (b) Apply the service brakes lightly and release; apply and release. Keep the engine rpm between 1500 and 1900 by downshifting the transmission as the vehicle slows. This will allow the engine to assist in braking.
 - (c) Do not brake suddenly on slick roads. This may cause the vehicle to skid.
 - (d) If the tractor wheels do not have good traction, do not use the retarder system.
- (14) When parking in snow and on ice, do the following:
- (a) Park the vehicle in a sheltered area out of the wind, if possible. If no shelter is available, park so the vehicle does not face into the wind.
 - (b) Place boards, brush, or other material that will give traction under the tires. This will guard against tires freezing to the ground or becoming pocketed in ice and will give traction when the vehicle is moved again.

(c) Chock the tires and place the transmission in neutral. Do not apply the parking brake. The brake shoes may freeze in the applied position.

(d) Clean snow, ice, and mud off the vehicle as soon as possible.

3. Practical exercise: Hand out one practical exercise to each student. Students will complete the practical exercise within 15 minutes.

4. Evaluate: Check each student's practical exercise.

5. Summary:

a. Recap main points.

b. Allow for questions.

c. Clarify questions.

d. Give closing statement.

6. Retraining: Retrain and retest No-Gos. No-Gos will be retrained and retested after normal duty hours.

E. SAFETY RESTRICTIONS. None.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 1 hour (.5 conference and .5 practical exercise).

PRACTICAL EXERCISE

LESSON TITLE: OBSERVE SAFETY RULES AND PROCEDURES FOR DRIVING UNDER ADVERSE ROAD CONDITIONS

NAME	RANK	DATE
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To complete this practical exercise, you will need a pen or pencil. You have 15 minutes to complete this practical exercise and will be graded on a Go/No-Go basis.

SECTION I. True/false questions: Read each question carefully and place a T or F on the blank line to the left of each question.

- _____ 1. When operating in sand, you should keep the accelerator pedal steady after vehicle reaches the desired speed.
- _____ 2. The differential lock can be shifted to the lock position while the vehicle is moving without causing any damage to the vehicle.
- _____ 3. Apply the brakes intermittently and lightly, using the engine to full advantage for braking effect in snow or on ice.
- _____ 4. When descending a steep or very slippery grade, you should use at least one gear range lower than normal.

SECTION II. Multiple choice: Read each question carefully and write the answer which is most correct on the blank line to the left.

- _____ 5. Which of the following procedures are recommending for driving in snow and on ice?
 - a. Accelerate slowly.
 - b. Drive at slower speeds.
 - c. Give signals sooner.
 - d. All the above.
- _____ 6. 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.

- _____ 7. When parking your vehicle in extreme cold or a desert environment, in what direction should the vehicle be parked?
- a. Face into the wind.
 - b. Sideways.
 - c. Face away from the wind.
 - d. No specific way.
- _____ 8. To keep the wheels from spinning when placing the vehicle in motion in snow or on ice, you should accelerate--
- a. Quickly.
 - b. Any way you want.
 - c. Slowly
 - d. None of the above.
- _____ 9. If your vehicle starts to skid, you should--
- a. Step on the brake pedal and hold the steering wheel straight.
 - b. Do nothing.
 - c. Release the accelerator pedal and steer in the direction of the skid.
 - d. Release the accelerator pedal and steer in the opposite direction of the skid.

LESSON TITLE: IDENTIFY INSTRUMENTS, CONTROLS, AND INDICATORS

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

A. TRAINING OBJECTIVE.

- TASK:** Identify instruments, controls, and indicators.
- CONDITION:** Given instruction on the M916 LET or the M920 MET.
- STANDARDS:** Correctly identify and explain the function of the instruments, controls, and indicators.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Motor pool as scheduled.
3. Training type: Conference.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One primary instructor and one assistant instructor for every three students.
6. Training aids and equipment: One M916 or M920 for every three students. If the class is large, a PA system may be needed for the primary instructor.
7. References: TM 9-2320-273-10.

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.

NOTE: At this time, separate the class into groups of three and assign each group to a vehicle. Ensure each group has an assistant instructor. The assistant instructor will identify and demonstrate the use of each item to his group of students as the instructor explains each item.

2. Explanation and Demonstration: Location, description, and use of the instruments, controls, and indicators. This listing is a partial list of the more important instruments, controls, and indicators located on the M916/M920.

a. Instrument cluster:

- (1) Fuel supply gauge. It is the first gauge located at the top left of the instrument cluster and indicates the amount of fuel when the engine run switch is turned on.
- (2) Voltmeter. It indicates the rate of battery charge or discharge in volts. It is located to the right of the fuel supply gauge.
 - (a) Below 11 volts (red area): Indicates a low battery or possible malfunction. Stop the truck and report the problem to organizational maintenance.
 - (b) Above 15 volts (red area): Indicates the batteries are being overcharged due to malfunction. Report the problem to organization maintenance as soon as possible.
 - (c) Between 11 and 12 volts (yellow area): Indicates the battery is undercharged. Turn off all electrical circuits (if possible) and run the engine at the highest rpm permitted for the existing conditions. The voltmeter should indicate a charge in the green area. If not, report it to organizational maintenance.
 - (d) 12 to 15 volts (green area): Indicates the normal operating range.
- (3) Transmission oil temperature gauge. This is next in line and registers the transmission oil temperature in degrees Fahrenheit. The normal operating temperature is 40° to 220° F. If temperature goes above 220° F, stop the truck and notify organizational maintenance of the problem.

(4) Engine oil pressure gauge. This gauge registers the engine oil pressure in pounds per square inch (psi). The normal range at rated speed (2100 rpm) is 40-75 psi. The range at idle is 5-20 psi. At 1700-2100 rpm, the minimum oil pressure for safe operation is 30 psi. If, in this rpm range, the gauge does not show at least 30 psi, stop the engine immediately and investigate the cause.

(5) Air pressure gauge (front). It registers air pressure (in psi) in the front brake system. The normal operating range is 105 to 120 psi. Pressure below the normal operating range indicates a loss of air supply. This will result in a limited number of times the brakes can be applied before losing the front wheel brakes. At the first sign of pressure loss, STOP THE TRUCK AND INVESTIGATE THE CAUSE. It is located to the right of the oil pressure gauge.

(6) Low air pressure warning light. It is located between the two air pressure gauges. The red light will remain on and the buzzer will sound when the air system pressure in either section of the dual system is between 64 and 76 psi. If this light comes on or the buzzer sounds while driving, stop immediately and investigate the cause.

(7) Air pressure gauge (rear). This registers air pressure (in psi) in the rear brake system. The normal operating range is 105 to 120 psi. Pressure below the normal operating range indicates a loss of air supply. This will result in a limited number of times the brakes can be applied before the emergency brakes are automatically activated. At the first sign of pressure loss, STOP THE TRUCK AND INVESTIGATE THE CAUSE. It is located below the low air pressure warning light.

(8) Cigar lighter. It is located to the left of the rear air pressure gauge. Press to engage the heating element. The lighter will disengage automatically when hot.

(9) Engine start button. This button is located to the left of the cigar lighter. Press the button to energize the starter solenoid. The ENG TEMP light will come on while the button is depressed. Release the button when the engine starts. Do not press the button for more than 15 seconds at any one time. Allow 2 minutes interval between starting attempts. Do not press the button while the engine is running.

(10) Engine run switch. It is located to the left of the engine start button. Rotate the key to the right to turn this switch to the ON position (low oil pressure warning light, park brake light, and low air warning buzzer and light will come on if air pressure is below 60 psi). After the engine is started and the systems become operational, the warning light and buzzer

will go off. The park brake light will stay on until the park brake is released. Turn the key to the center (vertical) position to turn all systems OFF.

(11) Engine water temperature gauge. This gauge is located below the fuel supply gauge and registers the engine coolant temperature in degrees Fahrenheit (normal range is 165°-195° F). If this gauge shows temperatures above 225° F, shut off the engine immediately and refer to the troubleshooting procedures. Do not restart the engine until the coolant temperature is within the normal operating limits.

b. Tachograph section:

(1) Tachograph. It is located in the center of the tachograph section. The tachograph registers the truck ground speed (rpm/kph hand), engine speed (rpm hand), and the distance traveled (odometer). The other two hands are clock hands. The tachograph records data on a 7-day graph for a permanent record. Do not operate the vehicle without a tachograph disc installed.

(2) Clearance light push-button. This button is located to the right and below the tachograph. Press this button to flash the truck and semitrailer clearance and marker lights on and off. The clearance lamp indicator will come on when these lights are on.

(3) Clearance light indicator. It is located below the clearance light push button. This light will illuminate when the headlamp switch is pulled out to either the first or second position and the clearance light push button is pressed. Intensity of the light may be varied by rotating the headlamp switch knob.

(4) Ether quick start push button. This is located below and to the left of the tachograph. Press and release this button to inject ether for cold weather starting. Do not use this button without thoroughly reading the cold weather starting procedures in the operator's TM.

c. Control panel:

(1) Engine oil warning light. It is the first indicator warning light in the control panel. The red light comes on when the engine oil pressure is below operating limits. The light comes on when the oil pressure drops below 5 psi.

(2) Engine temperature warning light. This is next to the engine oil warning light. This red light comes on when the engine cooling system

temperature is above operating limits. The light comes on when the engine temperature exceeds 225 degrees F.

(3) Differential lockout indicator light. This light is below the engine temperature warning light. The red light indicates when the inter-axle differential lockout switch is in the LOCK position and the driveline locking system is engaged. The front drive axle is also locked.

(4) Power take-off (PTO) indicator light. This red light is next and comes on when the PTO control is engaged.

(5) Park brake indicator light. The red park brake indicator comes on when the park brake control is engaged.

(6) High beam indicator light. This blue light comes on when the dimmer switch is set for high beam service lights.

(7) Headlight switch knob. This knob is located to the right and slightly below the engine oil warning light. Pull the knob halfway out to turn on the marker lights, taillights, and instrument panel lights, or all the way out to operate the headlights, taillights, marker lights, and instrument panel lights. The switch also turns on the clearance lights in either position.

(8) Wiper indicator light. It is located to the right of the headlight switch knob and the engine retarder selection switch. The wiper indicator comes on when the headlight switch is pulled out to either the first or second position. The indicator light is white when lighted and can be dimmed by rotating the headlight switch knob. Its purpose is to aid in locating the wiper control at night.

(9) Wiper control knob. This is located below the wiper indicator light. Pull the knob out to turn the wipers on. Rotate the switch knob for hi and low operation. Push the knob in to turn the wipers off.

(10) Washer indicator light. It is located to the right of the wiper indicator light. The washer indicator light comes on when the headlight switch is pulled out to either the first or second position. The indicator is white when lighted and can be dimmed by rotating the headlight switch knob. Its purpose is to aid in locating the washer control knob at night.

(11) Washer control knob. This knob is located below the washer indicator light. Press the knob to spray cleaning solvent on the windshield. Release the button to stop spraying.

(12) Differential lock/unlock control. It is located to the right of the washer indicator light and the washer control knob. It controls the inter-

axle differential and also engages the front driving axle. In poor traction conditions (ice, snow, off road), stop the truck and place the switch in the lock position to lockup the driveline and engage the front driving axle. When conditions are back to normal, let up on the accelerator and move the switch to the unlock position momentarily; then place the switch in the center (off) position for normal driving.

CAUTION

Do not place the switch in the lock position while the truck is moving or when the tires are spinning.

NOTE: The differential lockout indicator light will come on when the control is in the LOCK position.

WARNING

Never use the parking brake for normal braking.

(13) Parking brake control. This is located below and to the left of the differential lock/unlock control. Pull out to apply the parking brakes; push in to release the parking brakes.

(14) Trailer air supply control. It is located to the left of the parking brake control and supplies air to the trailer air reservoirs. Push in to supply air to (charge) trailer reservoirs; pull out to shut off air to the trailer. If the tractor air system pressure drops to 60 psi, the trailer air supply protection valve will trip, fully applying the trailer spring brakes.

(15) Backup alarm override. It is the bottom toggle switch located to the left of the trailer air supply control. Place this switch in the up position to turn off the backup alarm when backing in "quiet zones." Return the switch to the down position to activate the alarm circuit.

WARNING

Before beginning backing operations, make sure the backup alarm override switch is in the down position. **DO NOT DISABLE THE ALARM AT TIMES WHEN PERSONNEL OR EQUIPMENT SAFETY MAY BE SACRIFICED AS A RESULT.**

(16) Stationary worklamps switch. It is located above the backup alarm override. Place this switch in the on position to turn the work lamps on and in the off position to turn them off.

(17) Engine retarder selection switch. This switch is located just above the stationary worklamps switch. Select the number of engine cylinders desired for the braking action. high position provides the maximum engine braking (6 cylinders), med position provides braking on 4

cylinders, and low position provides braking on 2 cylinders. For detailed instructions, see the information sheet in lesson outline "Drive Vehicle With Semiautomatic Transmission" in this TC.

(18) Blackout light switch. This is located to the left of the backup alarm override switch. Pull out and place the switch in the up (blackout) position and pull out the headlight switch to the 1st position to turn on the front and rear blackout marker lights. Pull the headlight switch to the 2nd position to turn on the blackout drive light. The blackout brake lights will operate with the headlight switch in either position. With the blackout light switch in the up position, the switch automatically locks out all regular service lights, the electric horn, and the backup lights. Return the blackout light switch to the down (normal) position to turn off the blackout lights and restore the regular lights.

NOTE: Pull the switch lever toward the seat to move it to either position. This prevents engagement or disengagement of the service lights.

CAUTION

Do not leave the blackout light switch in the blackout position for extended periods without the engine running. Otherwise the batteries can run-down and cause starting problems.

d. Lower control panel:

(1) Throttle control (hand). This is the first knob in the left corner of the lower control panel. Press the center of the button and pull the control knob until the engine speed is appropriate for operating the PTO or maintaining a fast idle. Release the button. For fine-tuning, turn the knob. Press the button and push in the control to return the engine to slow idle. This is not a cruise control and is not to be used as such while driving.

(2) Heat control knob. This knob is located to the right of the throttle control (hand). Pull out to increase the heater output temperature; push in to decrease output temperature.

(3) Heater fan speed switch. It is located to the right of the heat control knob. Rotate to the right for low, med, and high fan speed. Turn full left to turn off.

(4) Heater air control (driver). Pull out to divert heater air to the driver's side of the cab. Push in to close the vent.

(5) Heater air control (passenger). Pull out to divert heater air to the passenger side of the cab. Push in to close the vent.

- (6) Fresh air vent. Pull out to receive fresh air in the passenger's side of the cab. Push in to close the fresh air vent.
- (7) Recirculation vent. It is located to the right of the fresh air vent. Pull out to circulate cab air through the heater. Push in to close the vent.
- (8) Air filter restriction indicator. It is mounted to the right of the lower control panel. When the air cleaner air flow is adequate, the window on the indicator will show clear. If the air flow is restricted, the window will show red. After the air filter has been cleaned, push the reset button to reset the air filter indicator.

NOTE: Air cleaner maintenance is required when red shows in the window. Notify organizational maintenance.

e. Floor mounted foot controls:

- (1) Headlight dimmer switch. This switch is located on the floor to the left of the engine retarder foot switch. Push all the way down with the left foot and release to switch headlights to high beam. Push all the way down and release again to dim headlights.

NOTE: The high beam indicator light will come on when the headlights are working in the high beam position.

- (2) Engine retarder foot switch. This is to the left of the service brake pedal. The hand throttle control must be completely in. Depress the foot pedal, which activates the switch to engage the engine brake. Release the foot pedal to disengage the engine brake. The accelerator pedal must be full up before the foot switch will operate. Select the desired braking range using the retarder selection switch.
- (3) Service brake pedal. It is located between the engine retarder foot switch and the accelerator pedal. Push down with your foot to apply the service brakes. If your truck is properly coupled, the trailer service brakes will also be applied when using your truck's service brake pedal.
- (4) Accelerator pedal. It is located to the right of the service brake pedal. Push down gradually with your foot to increase engine speed or to start the truck moving.
- (5) Decontamination apparatus and bracket. It is mounted on the right (passenger) firewall. Remove from the bracket, pull the ring pin, lift the handle until it locks, aim, and press the top.

f. Transmission controls:

(1) Transmission air control valve. This valve is located to the right of the driver's seat. Push in on this valve to provide the transmission with operating air from the vehicle supply. When the vehicle air supply is 80 psi or greater, the charging valve will stay in when released. Pull out on the charging valve to remove the air supply; the transmission will neutralize automatically.

CAUTION

The transmission will neutralize if the vehicle air supply drops below 80 psi.

CAUTION

The transmission clutch disengages at engine speeds of 1100 rpm or less causing loss of braking efficiency of the engine as a brake. This condition can damage the transmission clutch if held in low rpm range over 12 seconds. **DOWNSHIFTING WITHIN THIS TIME IS MANDATORY.**

CAUTION

The drivelines must be disconnected to tow the truck; otherwise the transmission will be damaged.

CAUTION

Use the service brakes to hold the truck while stopped on a grade. **DO NOT USE THE TRANSMISSION TO HOLD THE TRUCK** as clutch damage can result.

CAUTION

Do not use the inhibitor override while the truck is in motion.

(2) Transmission ratio selector. This selector is located above the transmission air control valve. Move the selector lever forward or rearward to select the desired gear ratio position. The transmission has 16 forward gears and 2 reverses. For complete operating instructions see lesson outline, "Drive Vehicle with Semiautomatic Transmission."

(3) Power take-off (PTO) control. It is located to the rear of the transmission ratio selector. With the transmission in 1st gear, pull cable knob to engage the power take-off unit; then place the transmission in neutral. Push the cable knob to disengage the power take-off unit. When the PTO has disengaged, the indicator light will go off.

(4) Power take-off indicator light. It is located above the PTO control. When the PTO is engaged, the indicator light will light up. When the PTO is disengaged, the indicator light will go out.

(5) Pusher axle controls (M920 only). These controls are located to the rear of the PTO control. Use this control panel to lower and raise the pusher axle and to pressurize the system to adjust the amount of weight carried by the pusher axle. To lower the pusher axle, rotate the control pressure knob to full counter-clockwise to remove the pressure from the pusher axle. The pressure gauge should indicate 0 psi. Place the pusher axle raise/lower control in the axle down position. To adjust the load on the pusher axle, rotate the control pressure knob clockwise until the pressure gauge indicates the proper setting for the desired load. Tighten the set screw to lock the control pressure knob at the pressure selected. With the set screw tightened at a particular setting, the control pressure knob can be closed and reset to the previous setting. To raise the pusher axle, set the raise/lower control at the axle lift position.

CAUTION

Do not rotate the control knob counterclockwise to raise the axle. This causes the air to exhaust and allows the bag to fold unevenly which can result in damage to the air bag.

(6) Air pressure gauge. This gauge is located between the pusher axle control and the control pressure knob. It indicates the air pressure load (in psi) on the pusher axle.

g. Steering column controls:

(1) Emergency flasher control and turn signal lever. This control is mounted on the left side of the steering column. Pull out to turn on the emergency flashers. Push turn signal lever up or down and return it to the center to turn off the emergency flashers. The turn signal lever is part of the emergency flashers. Push the lever up to turn on the right turn signal. Pull the lever down to turn on the left turn signal. Return to the center position when the turn is completed.

(2) Horn button. It is located in the center of the steering wheel. Push on the button to sound the horn. The truck is also equipped with an air horn located overhead to the driver's left front. To sound the horn pull down on the chain.

(3) Trailer hand brake control. This control is mounted opposite of the turn signals control. Pull down to apply trailer brakes only. Use only to test the semitrailer brakes. Using it when driving will cause the semitrailer to skid. To park, use the parking brake or chock the wheels.

Using the semitrailer hand control to park can cause all the air to leak out. Be sure to return the control to its off position (all the way up).

(4) Steering wheel. Rotate right to turn the front wheels to the right. Rotate left to turn the front wheels to the left.

CAUTION

Do not hold the steering wheel in full steer position for more than 10 seconds as the pump fluid will overheat and could cause damage to the equipment.

5. Summary:

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

E. SAFETY RESTRICTIONS. None.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 1.5 hour conference.

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

TASK NUMBER: 551-721-1352 (Perform vehicle preventive maintenance checks and services [PMCS])

A. TRAINING OBJECTIVE.

TASK: Perform operator PMCS on the M916 or M920 tractor.

CONDITION: Given instruction, a DA Form 2404, a pencil, TM 9-2320-273-10, equipment records folder, rags, lubricants, coolant, and an M916 or M920 tractor with BII.

STANDARDS: Inspect the vehicle according to the PMCS tables listed in TM 9-2320-273-10, correct all faults within the operator's level of maintenance, and legibly record all others on DA Form 2404. If no faults are found, make necessary entries on DA Form 2404.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Motor pool as scheduled.
3. Training type: Demonstration and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for every three students for the demonstration and practical exercise.
6. Training aids and equipment: Hearing protection, rags, lubricants, and coolant. DA Form 2404, pencil, TM 9-2320-273-10, equipment records folder, and an M916 or M920 tractor with BII for every three students.
7. References: TM 9-2320-273-10 and DA Pamphlet 738-750.

D. SEQUENCE OF ACTIVITY.

1. Introduction:

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- a. Interest device.
- b. Tie-in.
- c. Lesson objective (paragraph A).
- d. Procedures:
 - (1) Explanation.
 - (2) Practical exercise.
 - (3) Summary.
2. Explanation and Demonstration: Demonstrate before-, during-, and after-operation PMCS.
3. Practical exercise:
 - a. Assign students to vehicles and issue TM 9-2320-273-10, pencils, DA Form 2404, and equipment records folder. Instruct students on the location of rags, lubricants, and coolant.
 - b. Students perform PMCS.
4. Evaluate: Check each student's PMCS 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. Students perform PMCS daily and are tested on the EOCCT.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when the vehicles are parked.
2. Always place the transmission in neutral, set the parking brake, and shut off the engine before leaving the vehicle.

3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that all personnel wear hearing protection when the engine is running.
5. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
6. Ensure that personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 5 hours (.5 demonstration and 4.5 hours practical exercise). The remaining PMCS is performed throughout the course in conjunction with driving tasks.

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

TASK NUMBER: 551-721-1353 (Perform preventive maintenance checks and services [PMCS] on trailers)

A. TRAINING OBJECTIVE.

TASK: Perform operator PMCS on the M172A1 or M870 semitrailer.

CONDITION: Given instruction, a DA Form 2404, a pencil, TM 9-2330-294-14, equipment records folder, rags, lubricants, coolant, and an M916 tractor coupled to an M172A1 or M920 tractor coupled to an M870 semitrailer with BII.

STANDARDS: Inspect the semitrailer according to the PMCS tables listed in TM 9-2330-211-14P for the M172A1 or TM 5-2330-360-14P for the M870, correct all faults within the operator's level of maintenance, and legibly record all others on DA Form 2404. If no faults are found, make necessary entries on DA Form 2404.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Motor pool as scheduled.
3. Training type: Demonstration and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for every two students for the demonstration and practical exercise.
6. Training aids and equipment: Hearing protection, rags, lubricants, and coolant. DA Form 2404, pencil, TM 9-2330-211-14P or TM 5-2330-360-14P, equipment records folder, and an M916 tractor coupled to an M172A1 or an M920 tractor coupled to an M870 semitrailer with BII for every two students.
7. References: TM 9-2330-211-14P or TM 5-2330-360-14P and DA Pamphlet 738-750.

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: Demonstrate before-, during-, and after-operation PMCS.
3. Practical exercise:
 - a. Assign students to vehicles with semitrailer and issue TM 9-2330-211-14P or TM 5-2330-360-14P, pencils, DA Form 2404, and equipment records folder. Instruct students on the location of rags, lubricants, and coolant.
 - b. Students perform PMCS.
4. Evaluate: Check each student's PMCS 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. Students perform PMCS daily and are tested on the EOCCT.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when the vehicles are parked.

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2. Always place the transmission in neutral, set the parking brake, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that all personnel wear hearing protection when the engine is running.
5. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
6. Ensure that personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 5 hours (.5 demonstration and 4.5 hours practical exercise).

LESSON TITLE: COUPLE SEMITRAILER

TASK NUMBER: 551-721-1314 (Couple semitrailer)

A. TRAINING OBJECTIVE.

TASK: Couple the tractor to an empty semitrailer.

CONDITION: Given instruction, a suitable training area, an M916 tractor and an M172A1 semitrailer, or an M920 tractor and an M870 semitrailer.

STANDARDS: Couple the tractor/semitrailer combination in the correct sequence without causing damage to equipment or injury to personnel.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training locations: Training area as scheduled.
3. Training type: Demonstration and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for every three students for the demonstration and practical exercise.
6. Training aids and equipment: Hearing protection, an M916 tractor and an M172A1 semitrailer with BII for every three students, or an M920 tractor and an M870 semitrailer with BII for every three students.
7. Reference: TM 9-2320-273-10.

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: Demonstrate coupling procedures.

a. Preparation for coupling before backing under the semitrailer:

- (1) Ensure that trailer wheels are blocked firmly behind the wheels on both sides of the semitrailer. On level ground, one side is blocked at the tire's front and the opposite side is blocked at the tire's rear.
- (2) Visually check the fifth wheel for cracked, damaged, or missing parts.
- (3) Check mountings for good condition and mounting bolts for tightness.
- (4) Check that all moving parts and top of fifth wheel are properly lubricated.
- (5) Pull the fifth wheel secondary lock release handle all the way out and raise it so that it hooks on the fifth wheel housing.

NOTE: The fifth wheel primary lock release handle can be in the out or in position to latch.

- (6) Be sure that the fifth wheel ramps are down and level with or slightly below the angle of the pickup ramps.

b. Backing toward the semitrailer:

- (1) Position a ground guide at the left rear and away from the path of travel of the tractor (never directly behind) to guide and give coupling instructions. Ensure that the driver and ground guide understand proper hand and arm signals.

CAUTION

Do not permit anyone to stand directly between the tractor and semitrailer during the coupling procedure. Failure to follow this warning can result in injury to personnel.

- (2) Align the tractor straight in front of the semitrailer.

(3) Adjust the trailer height so that the fifth wheel picks up the trailer on the fifth wheel ramps.

(4) Slowly back the tractor under the semitrailer gooseneck so that the gooseneck slides up the approach ramps with the semitrailer kingpin centered as closely as possible in the throat of the fifth wheel.

CAUTION

Be careful not to run the kingpin up the fifth wheel ramps, as this will damage the kingpin, the fifth wheel, or the payload.

(5) Make sure you have picked up the semitrailer with the fifth wheel ramps. If the kingpin comes in too high, it will not engage in the fifth wheel correctly

(6) When you have correctly picked up the semitrailer on the fifth wheel ramps, stop backing. Stopping at this point helps to prevent hitting too hard in coupling.

(7) Set the tractor parking brake.

c. Coupling:

(1) Connect the air hoses (red emergency air hose glad hand to the semitrailer emergency glad hand and blue service air hose glad hand to the semitrailer service glad hand) and electrical cable; then push in the trailer supply control knob and set the trailer hand brake.

(2) Release the parking brake and slowly back up until the fifth wheel locks firmly to the kingpin. Pull against the load with the trailer hand brake set. This will apply pressure against the kingpin and provide a test to ensure a secure coupling.

(3) Apply the parking brake and verify that the lock release handles are in.

(4) Be sure the kingpin is not locked over the front of the fifth wheel.

NOTE: The kingpin must be in the locks. You should not be able to see daylight between the upper fifth wheel plate of the semitrailer and the fifth wheel.

(5) Raise and secure the semitrailer landing gear.

(6) On the M172 model, release the trailer hand brake.

(7) Stow the chock blocks and perform PMCS on the semitrailer (see lesson "Perform Operator PMCS on Semitrailer").

(8) Be sure the air pressure gauges read from 105 to 120 psi before putting the tractor in motion.

3. Students perform before-operation PMCS.
4. Practical exercise: Students practice coupling the tractor/semitrailer in the coupling/uncoupling training area (see Chapter 4, Figure 4-1).
5. Evaluate: Check each student's coupling performance.
6. Summary:
 - a. Recap main teaching points.
 - b. Allow for questions.
 - c. Clarify questions.
 - d. Give closing statement.
7. Retraining: Retrain and retest No-Gos. No-Gos will be retrained after normal duty hours. Students are tested on the EOCCT.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when the vehicle is parked.
2. Always place the transmission in neutral, set the parking brakes, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Ensure that ground guides are always used when backing.
6. Always wear hearing protection when working in or around a running vehicle.
7. Ensure that the driver and ground guides know and understand the hand and arm signals as outlined in FM 21-305.

8. Never back at a speed over 5 mph.
9. Ensure that personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 3.5 hours (.5 demonstration and 3 hours practical exercise to include .5 before-operation PMCS).

LESSON TITLE: UNCOUPLE SEMITRAILER

TASK NUMBER: 551-721-1315 (Uncouple semitrailer)

A. TRAINING OBJECTIVE.

TASK: Uncouple the tractor from an empty semitrailer.

CONDITION: Given instruction, a suitable training area, an M916 tractor and an M172A1 semitrailer, or an M920 tractor and an M870 semitrailer.

STANDARDS: Uncouple the tractor from the semitrailer in the correct sequence without causing damage to the equipment or injury to personnel.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training locations: Training area as scheduled.
3. Training type: Demonstration and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for every three students for the demonstration and practical exercise.
6. Training aids and equipment: Hearing protection, an M916 tractor and an M172A1 semitrailer with BII for every three students, or an M920 tractor and an M870 semitrailer with BII for every three students.
7. Reference: TM 9-2320-273-10.

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: Demonstrate uncoupling procedures.

- a. Pull out the trailer air supply valve.
- b. Apply the parking brakes, verifying that the parking brake indicator light comes on. This will keep the tractor from running out from under the semitrailer when you unlock the fifth wheel.
- c. Chock semitrailer wheels. On level ground, wheels should be chocked on one side in front of the wheels and the other side to the rear of the wheels. Behind wheels on both sides on upgrades. Place chocks in front of both wheels on downgrades.
- d. Lower the semitrailer landing gear.
- e. On the M172A1 model, set the trailer hand brake.
- f. Disconnect and secure the trailer air hoses (to harness holder) and light cable (in stowage compartment).
- g. Unlock the fifth wheel by first pulling the secondary lock release handle out and raising it so that it hooks on the fifth wheel housing. Then pull the primary lock release handle out and hook it in the unlocked position the same way as the secondary lock handle.
- h. Have a crewmember observe the semitrailer kingpin to make sure it clears properly during uncoupling.

CAUTION

Make sure the kingpin clears the rear frame cross members are pulling the tractor forward.

- i. Release the parking brake and slowly pull the tractor forward, allowing the semitrailer gooseneck and kingpin to slide down the fifth wheel and ramps until the semitrailer landing gear touches the ground.

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3. Practical exercise: Students practice coupling/uncoupling the tractor/semitrailer in the coupling/ uncoupling training area (see Chapter 4, Figure 4-1).
4. Evaluate: Check every student's uncoupling performance.
5. Students perform after-operation PMCS.
6. Summary:
 - a. Recap main teaching points.
 - b. Allow for questions.
 - c. Clarify questions.
 - d. Give closing statement.
7. Retraining: Retrain and retest No-Gos. No-Gos will be retrained after normal duty hours. Students are tested on the EOCCT.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when the vehicle is parked.
2. Always place the transmission in neutral, set the parking brakes, and shut off the engine before leaving vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Ensure that ground guides are always used when backing.
6. Always wear hearing protection when working in or around a running vehicle.
7. Ensure that the driver and ground guide know and understand the hand and arm signals as outlined in FM 21-305.
8. Never back at a speed over 5 mph.
9. Ensure that personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 3 hours (.5 demonstration, and 2.5 practical exercise including .5 after-operation PMCS).

LESSON TITLE: DRIVE VEHICLE WITH SEMIAUTOMATIC TRANSMISSION

TASK NUMBER: 551-721-1364 (Drive vehicle with semiautomatic transmission)

A. TRAINING OBJECTIVE.

TASK: Drive an M916/M920 tractor with semiautomatic transmission.

CONDITION: Given instruction, a DD Form 1970, DA Form 2404, pencil, TM 9-2320-273-10, equipment records folder, rags, lubricants, coolant, a suitable driver training area, an M916/M920 tractor (bobtail) with BII.

STANDARDS: Operate the semiautomatic transmission on the M916/M920 vehicle; upshift and downshift through all gears and perform basic driving maneuvers to include correct backing using a ground guide.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Motor pool and driver training area as scheduled.
3. Training type: Conference, demonstration, and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every two students for the demonstration and practical exercise.
6. Training aids and equipment: Hearing protection; rags; lubricants; coolant; and 40 traffic cones, empty POL drums, or barricades; DA Form 2404; DD Form 1970; pencil; TM 9-2320-273-10; an M916 or M920 tractor (bobtail) with BII for every two students.
7. References: TM 9-2320-273-10.

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. Transmission air control valve.

- (1) Located on the left side of the transmission range selector control.
- (2) When the vehicle air supply is 80 psi or greater, push in on this valve to provide the transmission with operating air from vehicle air supply.
- (3) Pull out this valve to remove the air supply. This will automatically neutralize the transmission.

NOTE: The transmission will automatically go into neutral when the air pressure drops below 80 psi.

b. Transmission range selector lever.

- (1) This lever is located in a panel slightly forward and to the right of the driver's seat. Use it to select the proper transmission gear range for a particular driving condition.
- (2) Neutral "N" is used for parking and starting the engine. The engine will not start with the selector lever in any other position.
- (3) Reverse ranges are used for backing. Completely stop the M916/M920 tractor before shifting from a forward gear range to reverse or from reverse to a forward gear range. Use "R1" for heavy loads or where a slower reverse speed is required due to congestion or other hazards. "R2" is the normal reverse range.
- (4) Forward gear ranges are "1" through "16" with "1" being the lowest gear ratio and "16" the highest. Move the selector lever forward or rearward to select the desired gear ratio position. The transmission will

remain in the previously selected position until the selector lever is moved into the notch adjacent to the newly selected gear ratio. Progression through the full range of 16 forward gear ratios may be done two steps at a time up to 11th gear or one step advance from 11th to 16th gears.

(5) A built in inhibitor prevents more than a two step advance (or one step advance from 11th to 16th positions). An inhibitor override is provided to allow selection of the proper gear ratio for pulling out. This is done by pulling upward on the transmission selector lever and may only be used when the truck is at a standstill.

CAUTION

Do not use the inhibitor override while the truck is in motion.

(6) Engine governed speed is 2100 rpm. The transmission will totally disengage above 2300 rpm and under 1100 rpm resulting in--

- (a) Freewheeling.
- (b) Loss of engine braking.

c. Recommended rpm.

- (1) The highway cruising range is 1800 to 1900 rpm.
- (2) In cities and other congested areas, select a gear that permits operation of not less than 1500 rpm.

d. Pulling out:

- (1) Check gauges and instruments.
- (2) Turn on lights as appropriate.
- (3) Depress the transmission air control button. It may be necessary to shift through all the gears at idle speed several times to eliminate transmission air leaks, particularly in cold weather.
- (4) Pull up on the selector lever to override the inhibitor. Select the starting gear ratio:
 - (a) Empty to 75,000 lb GCWR, 6th gear.
 - (b) 75,000 to 105,000 lb GCWR, 4th gear.
 - (c) 105,000 to 130,000 lb GCWR, 3rd gear.

- (5) Release the parking brake by pushing in on the parking brake control.
- (6) Gradually depress the accelerator pedal.

CAUTION

With the transmission engaged, do not operate this vehicle with the engine speed below 1200 rpm or above 2100 rpm. Serious transmission damage will result.

CAUTION

When starting with a load, you must accelerate the engine speed through 1200 rpm in three seconds or less to prevent damage to the front clutch. If rpm does not increase above 1200 rpm in three seconds, let up off the accelerator and shift to a lower gear.

CAUTION

Do not start this truck in gears one, two, or three with fast acceleration. Serious driveline damage will result. If it is necessary to start in these lower gears, gradually accelerate when starting as you shift through these gears.

- (7) Upshifts can be made at any engine speed above 1750 rpm. Ease up on the accelerator when the shift selector is placed into the detent. This will provide a smooth shift.
- (8) Downshifts must always be made when the engine speed is at or below 1650 rpm. Accelerate when the shift selector is placed into the detent.

e. Hauling up a hill.

- (1) The engine works hardest when moving a loaded truck up a grade. The proper use of gears will shorten time on hills and minimize the amount of shifting.
- (2) As you start uphill, depress the accelerator pedal all the way down and keep it there as the truck moves up the grade. If there is enough power to maintain a satisfactory rpm, remain in that gear for the entire grade.
- (3) If the hill causes a steady decline in engine rpm, downshift when the engine rpm is at or below 1650. Continue to downshift in this manner until the engine rpm can be maintained.

(4) By remaining in each gear until arriving at the next lower shift point, the truck will top the hill in the best possible time on less fuel and fewer shifts.

f. Descending grades.

(1) Do not over speed the engine. Never allow the engine to be pushed above governed rpm when rolling down a grade.

(2) Progressive downshifting and using the engine retarder when starting down a grade from the top of a hill will provide better control around curves and turns and save the brakes.

(3) For detailed instructions on the use of the engine retarder (Jacobs brake), see the information sheet at the end of this lesson.

g. Differential lockup.

(1) The differential lockup provides additional traction by applying full torque to the front and both rear axles. Use this feature any time tractive conditions are poor, such as rainy, snowy or icy pavement.

(2) The differential control is located on the right side of the control panel. The center (off) position is the normal operating position, allowing full differential action to all three axles.

(3) For maximum traction in poor traction conditions (ice, snow, off road), stop the vehicle then move the lever to the lock position to lock the driveline. When traction is back to normal, let up on the accelerator and move the switch to the unlock position momentarily; then place the switch in the off position while the truck is moving.

(4) The differential lockout control indicator light will come on when the control is in the lock position.

h. Explain ground guide safety precautions for backing the M916/M920.

i. Demonstrate hand and arm signals required for this exercise.

j. Demonstrate driving and backing within the training area.

3. Practical exercise:

a. Assign students to vehicles and issue TM 9-2320-273-10, 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 M916/M920 without a semitrailer through the course laid out in the training area (see Chapter 4, Figures 4-2, 4-3, and 4-4). During-operation PMCS is also conducted at this time.

NOTE: As each student practices driving, an assistant instructor rides in the right front seat. The success of this driver training program is the ability of the instructor to get in the cab of the truck with the student driver and pass on valuable experience and proper driving techniques. Now is the time to correct any bad driving habits.

- d. After the students have mastered driving the vehicle in the training area, the students will then practice driving on the road.
4. Evaluate: Check every student's PMCS performance and driving to include backing.
 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 the vehicle is parked.
2. Always place the transmission in neutral, set the parking brake, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Ensure that ground guides are always used when backing the M916/M920.

6. Maintain a safe following distance and speed limit when driving in the training area (as determined by the local command).
7. Always wear hearing protection when working in or around a running vehicle.
8. Do not shift the differential lock/unlock lever to the lock position while the vehicle is moving.
9. Ensure that personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 4 hours (.5 conference, .5 demonstration, and 3.0 practical exercise including .5 PMCS).

SAMPLE ESCORT/CONTROLLER'S BRIEFING SHEET

1. Always follow civilian/military police instructions when given.
2. On controlled access highways, use truck-parking areas only.
3. Make only emergency halts on the roadside of controlled access highways.
4. Do not stand on the traffic side of a vehicle during halts on conventional highways.
5. Perform vehicle operation maintenance and check cargo security at every halt.
6. Move vehicles off the highway before beginning maintenance.
7. Have reflectors and warning devices in place before beginning maintenance.
8. Use warning lights during periods of darkness or reduced visibility.
9. Begin movement only at the escort/controllers signal.
10. Observe vehicle speed restrictions: _____ as determined by the local commander.
11. Observe vehicle intervals (minimums):
 - a. Controlled access highway - 200 yards.
 - b. Rural conventional highway - 150 yards.
 - c. Urban conventional highway - 50 yards.
 - d. Blackout conditions - 60 to 180 feet.
12. Use the acceleration lane, when available, to reach highway speed.
13. Gradually attain proper vehicle interval once on the main route.
14. Operate all vehicles with headlights on at all times (except when under blackout conditions).
15. Use warning devices correctly.
16. Remember the following: Because of the weight of the M916/M920 combination, roadways and curbs may give way, causing the vehicle to turn over. When approaching oncoming traffic on a narrow road--
 - a. Signal your intentions.
 - b. Move to the right of the roadway only as far as you safely can and stop.
 - c. Wait until the other vehicles have passed and resume travel on the most solid part of the road.
17. Add any additional comments as local conditions warrant.

ENGINE RETARDER (JACOBS BRAKE) INFORMATION SHEET

1. The M916/M920 series equipment transporters are equipped with a retarder system that enables the engine to act as a brake. Use the engine retarder for descending grades in city traffic 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 retarder is most effective between 1750-2000 rpm.

2. Do not use the engine retarder in first, second, or third gears, except when descending steep grades. Never allow the engine speed to drop below 1200 rpm with the engine retarder applied. This will cause serious transmission damage. Do not engage the engine retarder when shifting or when the transmission is in neutral.

3. The following procedures should be followed when **THE TOWING VEHICLE TIRES HAVE GOOD TRACTION**:

a. Select a gear that will allow the engine with the engine retarder applied to control the truck speed with the engine at or below 2000 rpm and service brakes not applied. This means as you approach a downgrade, progressively select a gear that when combined with the engine retarder will allow you to maintain an engine speed of 1750-2000 rpm.

b. As engine speed exceeds 2000 rpm, apply the service brakes one time to slow the engine speed to 1650 rpm, release the engine retarder, downshift one gear (example if you are in 10th gear you would downshift to 9th gear) and reapply the engine retarder. Repeat this procedure until you can maintain the engine speed between 1750-2000 rpm.

c. If the engine over speeds (above 2100 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.

d. If the transmission over speeds (above 2300 rpm) and the transmission totally disengages, perform the following:

(1) Release the engine retarder.

(2) Upshift the transmission to the next higher gear (for example, if you are in 10th gear, you would upshift to 11th gear).

(3) Apply the service brakes one time to slow the vehicle speed and help regain control of the vehicle.

e. If the transmission totally disengages from the engine due to a shift being made with the engine retarder applied and the engine speed has returned to low idle freewheeling, accelerate the engine to reengage the transmission.

f. If you experience a total loss of braking due to heat buildup--

(1) Apply the engine retarder (place switch in high mode).

(2) Upshift as the engine speed approaches 2100 rpm. Before each upshift, release the engine retarder.

(3) In 16th gear, continue to apply the engine retarder and maintain directional control of the vehicle.

4. The instructors must emphasize and reemphasize the importance of the proper downhill braking procedures and the use of the engine retarder especially on slippery surfaces as outlined above and must instill in the drivers that if these procedures are not followed death or serious injury can result.

5. Also the instructors must explain to the students that braking ability and braking techniques are different when loaded 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: DRIVE VEHICLE ON IMPROVED (PRIMARY) ROADS WITHOUT A LOAD

TASK NUMBER: 551-721-3337 (Drive a light- or medium-equipment transporter on improved roads)

A. TRAINING OBJECTIVE.

TASK: Drive an M916 coupled to an empty M172A1 semitrailer or an M920 coupled to an empty M870 semitrailer on improved (primary) roads.

CONDITION: Given instruction, a DD Form 1970, a DA Form 2404, a pencil, TM 9 2320-273-10, equipment records folder, rags, lubricants, coolant, a suitable driving/training area, designated driving route, an M916 coupled to an empty M172A1 semitrailer or M920 coupled to an empty M870 semitrailer with BII.

STANDARDS: Drive the designated route using defensive driving (accident avoidance) methods; make right and left turns, make gradual steering corrections, signal intentions in advance, pass oncoming vehicles, maintain vehicle interval, obey highway warning and regulatory signs, operate the light switch, 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 retarder) and backing using ground guides without damage to equipment or injury to personnel.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Motor pool, driver training area, and designated driving routes as scheduled.
3. Training type: Conference and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every two students for the practical exercise.

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6. Training aids and equipment: Hearing protection, rags, lubricants, and coolant. DA Form 2404, DD Form 1970, pencil, TM 9-2320-273-10, equipment records folder, designated route strip map, an M916 coupled to an empty M172A1 semitrailer or an M920 coupled to an empty M870 semitrailer with BII for every two students. Wide load ahead and wide load follows signs for every vehicle. Escort/control vehicles are required (minimum of 2 vehicles recommended). Recommend a communication system for the control vehicles.

7. References: TM 9-2320-273-10, FM 55-312, and FM 21-305.

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: Instruments, controls, indicators, and basic driving techniques have been covered in previous instruction. The instructor may need to reinforce these subjects.

- a. Explain putting the vehicle in motion--
 - (1) On flat roadway.
 - (2) On upgrades.
 - (3) On downgrades.
 - (4) In sand, snow, and on ice.
 - (5) When signaling intentions.
 - (6) With transmission gear ranges.

- b. Explain the procedures for braking when--
- (1) Using the engine retarder (Jacobs brake)(see the information sheet at the end of this lesson).
 - (2) Using the service brakes.
 - (3) Driving on flat roadway.
 - (4) Driving downhill.
 - (5) Driving on sand, snow, ice, and wet surfaces.
 - (6) Using emergency braking procedures.
 - (7) Downshifting the transmission.
- c. Explain maneuvering the vehicle--
- (1) On curves.
 - (2) At intersections.
 - (3) At turns.
 - (4) When steering the vehicle.
 - (5) When making gradual steering corrections.
 - (6) To avoid abrupt steering movements.
- d. Explain changing lanes:
- (1) Signal intentions.
 - (2) Check mirrors.
- e. Explain the differential lockup mechanism.

CAUTION

Do not move the driveline locking system lock to the LOCK position while the truck is turning a corner or if tires are slipping. It is recommended that the truck be stopped before locking the differentials.

- f. Explain when and how to lower and raise the pusher axle (M920 only).

CAUTION

Do not operate the vehicle with the pusher axle in the lowered position off road, on rough roads, or on the highway without a payload.

g. Explain the following:

- (1) Steering the vehicle through a constant curve.
- (2) Maneuvering through a U-turn.
- (3) Passing stationary and moving vehicles (on narrow roads).

h. Giving a safety briefing (see sample convoy/controller briefing at the end of this lesson).

i. Explain ground guide safety precautions for backing the tractor semitrailer combination.

3. Practical exercise:

a. Assign students to vehicles and issue TM 9-2320-273-10, 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 maneuvering the vehicle through the courses laid out in the training area (see Chapter 4, Figures 4-2, 4-3, and 4-4).

d. After students demonstrate proficiency maneuvering the vehicle, they should practice downhill braking and driving the vehicle on the road.

NOTE: The success of this driver training program is the ability of the instructors to get in the cab of the truck with the student driver and pass on valuable experience and proper driving techniques. Now is the time to correct any bad driving habits.

NOTE: During-operation PMCS is also conducted at this time.

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

4. Evaluate: Check every student's performance on 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 the vehicles are parked.
2. Always place the transmission in neutral, set the parking brake, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Always use ground guides when backing the vehicle.
6. Maintain a safe following distance and speed limit when driving in the training area (as determined by the local command).
7. Always wear hearing protection when working in or around a running vehicle.
8. Ensure that personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 13.5 hours (1 conference and 12.5 practical exercise including 1 hour PMCS).

SAMPLE ESCORT/CONTROLLER'S BRIEFING SHEET

1. Always follow civilian/military police instructions when given.
2. On controlled access highways, use truck-parking areas only.
3. Make only emergency halts on the roadside of controlled access highways.
4. Do not stand on the traffic side of a vehicle during halts on conventional highways.
5. Perform vehicle operation maintenance and check cargo security at every halt.
6. Move vehicles off the highway before beginning maintenance.
7. Have reflectors and warning devices in place before beginning maintenance.
8. Use warning lights during periods of darkness or reduced visibility.
9. Begin movement only at the escort/controllers signal.
10. Observe vehicle speed restrictions: _____ as determined by the local commander.
11. Observe vehicle intervals (minimums):
 - a. Controlled access highway - 200 yards.
 - b. Rural conventional highway - 150 yards.
 - c. Urban conventional highway - 50 yards.
 - d. Blackout conditions - 60 to 180 feet.
12. Use the acceleration lane, when available, to reach highway speed.
13. Gradually attain proper vehicle interval once on the main route.
14. Operate all vehicles with headlights on at all times (except when under blackout conditions).
15. Use warning devices correctly.
16. Remember the following: Because of the weight of the M916/M920 combination, roadways and curbs may give way, causing the vehicle to turn over. When approaching oncoming traffic on a narrow road--
 - a. Signal your intentions.
 - b. Move to the right of the roadway only as far as you safely can and stop.
 - c. Wait until the other vehicles have passed and resume travel on the most solid part of the road.
17. Add any additional comments as local conditions warrant.

ENGINE RETARDER (JACOBS BRAKE) INFORMATION SHEET

1. The M916/M920 series equipment transporters are equipped with a retarder system that enables the engine to act as a brake. Use the engine retarder for descending grades in city traffic 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 retarder is most effective between 1750-2000 rpm.

2. Do not use the engine retarder in first, second, or third gears, except when descending steep grades. Never allow the engine speed to drop below 1200 rpm with the engine retarder applied. This will cause serious transmission damage. Do not engage the engine retarder when shifting or when the transmission is in neutral.

3. The following procedures should be followed when **THE TOWING VEHICLE TIRES HAVE GOOD TRACTION**:

a. Select a gear that will allow the engine with the engine retarder applied to control the truck speed with the engine at or below 2000 rpm and service brakes not applied. This means as you approach a downgrade, progressively select a gear that when combined with the engine retarder will allow you to maintain an engine speed of 1750-2000 rpm.

b. As engine speed exceeds 2000 rpm, apply the service brakes one time to slow the engine speed to 1650 rpm, release the engine retarder, downshift one gear (example if you are in 10th gear you would downshift to 9th gear) and reapply the engine retarder. Repeat this procedure until you can maintain the engine speed between 1750-2000 rpm.

c. If the engine over speeds (above 2100 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.

d. If the transmission over speeds (above 2300 rpm) and the transmission totally disengages, perform the following:

(1) Release the engine retarder.

(2) Upshift the transmission to the next higher gear (for example, if you are in 10th gear, you would upshift to 11th gear).

(3) Apply the service brakes one time to slow the vehicle speed and help regain control of the vehicle.

e. If the transmission totally disengages from the engine due to a shift being made with the engine retarder applied and the engine speed has returned to low idle freewheeling, accelerate the engine to reengage the transmission.

f. If you experience a total loss of braking due to heat buildup--

(1) Apply the engine retarder (place switch in high mode).

(2) Upshift as the engine speed approaches 2100 rpm. Before each upshift, release the engine retarder.

(3) In 16th gear, continue to apply the engine retarder and maintain directional control of the vehicle.

4. The instructors must emphasize and reemphasize the importance of the proper downhill braking procedures and the use of the engine retarder especially on slippery surfaces as outlined above and must instill in the drivers that if these procedures are not followed death or serious injury can result.

5. Also the instructors must explain to the students that braking ability and braking techniques are different when loaded 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: BACK VEHICLE WITHOUT A LOAD

TASK NUMBER: 551-721-1367 (Back vehicle with semitrailer)

A. TRAINING OBJECTIVE.

- TASK:** Back an M916 LET coupled to an empty M172A1 or an M920 MET coupled to M870 semitrailer.
- CONDITION:** Given instruction, a DD Form 1970, a DA Form 2404, a pencil, TM 9-2320-273-10, equipment records folder, rags, lubricants, coolant, a suitable training area, a LET coupled to an empty M172A1 or a MET coupled to an empty M870 semitrailer and BII.
- STANDARDS:** Back in a straight line into an alley 16 feet wide and 50 feet long using ground guides without causing damage to equipment or injury to personnel. Interpret correct hand and arm signals as given by a ground guide. Students will be graded on a Go/No-Go basis.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Motor park and training area as scheduled.
3. Training type: Conference, demonstration, and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every two students for the practical exercise.
6. Training aids and equipment: Hearing protection; rags; lubricants; coolant; and traffic cones, empty POL drums, or barricades. DA Form 2404, DD Form 1970, pencil, TM 9-2320-273-10, equipment records folder, a LET coupled to an empty M172A1 or a MET coupled to M870 semitrailer and BII for every two students.
7. References: TM 9-2320-273-10, FM 55-30, and FM 21-305.

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. Explain ground guide safety precautions for backing the tractor semitrailer combination.
- b. Explain proper hand and arm signals as outlined in FM 21-305.
- c. Demonstrate backing in a straight line into an alley 16 feet wide and 50 feet long without vehicle or semitrailer drifting into outer boundary or bumping into rear boundary. Place the transmission in R1 so the vehicle moves at a slower speed when backing with a heavy load or due to congestion or other hazards.
- d. Alignment of tractor and semitrailer; always try to sight side (driver side) back.
- e. Check to the rear to ensure that the way is clear. Walk behind the vehicle before backing to ensure there is adequate clearance; check clearance on each side, check the top to ensure there is adequate clearance, and then check under vehicle.
- f. Sound horn, flash lights to warn others that your truck is about to back.
- g. Turn on four way flashers to warn others that your truck is backing.
- h. Ensure proper use and alignment of both outside rear view mirrors to check path and clearance while backing.
- i. Explain steering.
 - (1) Oversteering (turning steering wheel too much too quickly).

(2) Turning the steering wheel to the left makes the rear of the semitrailer go to the right.

(3) Turning the steering wheel to the right makes the rear of the semitrailer go to the left.

j. Describe objects to monitor while backing.

(1) Both sides.

(2) Clearance to the front.

(3) Clearance to the rear.

(4) Overhead clearance.

k. Back slowly and use idle speed; recommended speed is 5 mph or less.

l. If necessary, realign the tractor/semitrailer as many times as needed.

m. Keep the window open and the radio off (if equipped).

n. Explain that the driver is still responsible for results (damage).

3. Practical exercise:

a. Assign students to vehicles and issue TM 9-2320-273-10, 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 backing the empty tractor semitrailer combination through the course laid out in the training area (see Chapter 4, Figures 4-2 and 4-4). During-operation PMCS is also conducted at this time.

NOTE: The success of this driver training program is the ability of the instructors to get in the cab of the truck with the student driver and pass on valuable experience and proper driving techniques. Now is the time to correct any bad driving habits.

4. Evaluate: Check every student's performance of PMCS and backing.

5. Summary:

a. Recap main points.

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- b. Allow for questions.
- c. Clarify questions.
- d. Give closing statement.

6. Retraining: Retrain and retest No-Gos. No-Gos will be retrained and retested after normal duty hours.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when the vehicles are parked.
2. Always place the transmission in neutral, set the parking brake, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Always use ground guide when backing the LET or MET.
6. Maintain a safe following distance and speed limit when driving in the training area (as determined by the local command).
7. Always wear hearing protection when working in or around a running LET or MET.
8. Do not shift the transfer case (differential lock/unlock control) lever to the lock position while vehicle is moving.
9. Ensure that the driver and ground guides know and understand the hand and arm signals as outlined in FM 21-305.
10. Never back at a speed over 5 mph.
11. Ensure that personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 4 hours (.5 demonstration and 3.5 practical exercise including .5 PMCS).

LESSON TITLE: DRIVE VEHICLE ON UNIMPROVED (SECONDARY) ROADS WITHOUT A LOAD

TASK NUMBER: 551-721-1368 (Drive vehicle with semitrailer on side roads and unimproved roads)

A. TRAINING OBJECTIVE.

TASK: Drive an M916 (LET) or M920 (MET) with semitrailer on a secondary or unimproved roads.

CONDITION: Given instruction, a DD Form 1970, a DA Form 2404, a pencil, TM 9-2320-273-10, equipment records folder, rags, lubricants, coolant, a suitable training/ driving area, and an M916 (LET) coupled to an empty M172A1 or M920 (MET) coupled to an empty M870 semitrailer, and with BII.

STANDARDS: Drive the designated route using defensive driving (accident avoidance) methods; make right and left hand turns, make gradual steering corrections, signal intentions in advance, pass oncoming vehicles, maintain vehicle interval, obey highway warning and regulatory signs, operate the light switch, monitor gauges and indicator lights, use proper braking procedures, engine retarder (Jacobs brake), and upshift/downshift the transmission through all gears without damage to equipment or injury to personnel.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom, motor park, and designated route.
3. Training type: Conference and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every two students for the practical exercise.
6. Training aids and equipment: Hearing protection, rags, lubricants, and coolant. DA Form 2404, DD Form 1970, pencil, TM 9-2320-273-10, equipment records folder, route strip map, a LET coupled to an empty M172A1 or MET coupled to an empty M870 semitrailer, with BII for every two students. Wide load ahead and wide load follows signs and escort/control

vehicles (minimum of 2 vehicles required). Recommend a communication system for the control vehicles.

7. References: TM 9-2320-273-10, FM 55-312, and FM 21-305.

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. Explain putting the vehicle in motion--
 - (1) On flat roadway.
 - (2) On upgrades.
 - (3) On downgrades.
 - (4) In sand, snow, and on ice.
- b. Explain the procedures for braking when--
 - (1) Using the engine retarder (Jacobs brake)(see the information sheet at the end of this lesson).
 - (2) Using the service brakes.
 - (3) Driving on level roadway.
 - (4) Driving downhill.

- (5) Driving on sand, snow, ice, and wet surfaces.
- (6) Using emergency braking procedures.

c. Explain maneuvering the vehicle--

- (1) On curves.
- (2) At intersections.
- (3) On roadways--
 - Steering the vehicle.
 - Making gradual steering corrections.
 - Avoiding abrupt steering movements.

d. Explain the following:

- (1) Changing lanes.
- (2) Steering the vehicle through a constant curve.
- (3) Maneuvering through a U-turn.
- (4) Passing stationary and moving vehicles (on narrow roads).

e. Giving safety briefing (see sample at the end of this lesson).

3. Practical exercise:

a. Students practice driving.

b. Due to the size, weight, and configuration of the LET coupled to an M172A1 or MET coupled to an M870 semitrailer, students should practice driving in a controlled training/driving area (see Chapter 4, Figures 4-2 and 4-3) until they are knowledgeable of the unique driving characteristics and feel comfortable with the vehicle. Then they should drive on assigned roadways with limited traffic until they have reached an acceptable degree of proficiency before advancing into an area with a large volume of traffic.

NOTE: During-operation PMCS is conducted at this time.

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NOTE: As every student practices driving, an assistant instructor rides in the cab and explains driving techniques, ensures the driver is aware of driving situations, and conducts AARs with each driver.

- c. Students perform after operation PMCS and ensure that all operator entries required on DA Form 2404 and DD Form 1970 are accurate, complete, and legible.
4. Evaluate: Check every student's PMCS performance 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 the vehicles are parked.
2. Always place the transmission in neutral, set the parking brake, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Always use ground guides when backing the LET or MET.
6. Maintain a safe following distance and speed limit when driving (as determined by the local command).
7. Always wear hearing protection when working in or around a running vehicle.
8. Ensure that personnel wear seat belts (if equipped) when vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 4 hours (.5 conference and 3.5 practical exercise including .5 PMCS).

SAMPLE ESCORT/CONTROLLER'S BRIEFING SHEET

1. Always follow civilian/military police instructions when given.
2. On controlled access highways, use truck-parking areas only.
3. Make only emergency halts on the roadside of controlled access highways.
4. Do not stand on the traffic side of a vehicle during halts on conventional highways.
5. Perform vehicle operation maintenance and check cargo security at every halt.
6. Move vehicles off the highway before beginning maintenance.
7. Have reflectors and warning devices in place before beginning maintenance.
8. Use warning lights during periods of darkness or reduced visibility.
9. Begin movement only at the escort/controllers signal.
10. Observe vehicle speed restrictions: _____ as determined by the local commander.
11. Observe vehicle intervals (minimums):
 - a. Controlled access highway - 200 yards.
 - b. Rural conventional highway - 150 yards.
 - c. Urban conventional highway - 50 yards.
 - d. Blackout conditions - 60 to 180 feet.
12. Use the acceleration lane, when available, to reach highway speed.
13. Gradually attain proper vehicle interval once on the main route.
14. Operate all vehicles with headlights on at all times (except when under blackout conditions).
15. Use warning devices correctly.
16. Remember the following: Because of the weight of the M916/M920 combination, roadways and curbs may give way, causing the vehicle to turn over. When approaching oncoming traffic on a narrow road--
 - a. Signal your intentions.
 - b. Move to the right of the roadway only as far as you safely can and stop.
 - c. Wait until the other vehicles have passed and resume travel on the most solid part of the road.
17. Add any additional comments as local conditions warrant.

ENGINE RETARDER (JACOBS BRAKE) INFORMATION SHEET

1. The M916/M920 series equipment transporters are equipped with a retarder system that enables the engine to act as a brake. Use the engine retarder for descending grades in city traffic 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 retarder is most effective between 1750-2000 rpm.

2. Do not use the engine retarder in first, second, or third gears, except when descending steep grades. Never allow the engine speed to drop below 1200 rpm with the engine retarder applied. This will cause serious transmission damage. Do not engage the engine retarder when shifting or when the transmission is in neutral.

3. The following procedures should be followed when **THE TOWING VEHICLE TIRES HAVE GOOD TRACTION**:

a. Select a gear that will allow the engine with the engine retarder applied to control the truck speed with the engine at or below 2000 rpm and service brakes not applied. This means as you approach a downgrade, progressively select a gear that when combined with the engine retarder will allow you to maintain an engine speed of 1750-2000 rpm.

b. As engine speed exceeds 2000 rpm, apply the service brakes one time to slow the engine speed to 1650 rpm, release the engine retarder, downshift one gear (example if you are in 10th gear you would downshift to 9th gear) and reapply the engine retarder. Repeat this procedure until you can maintain the engine speed between 1750-2000 rpm.

c. If the engine over speeds (above 2100 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.

d. If the transmission over speeds (above 2300 rpm) and the transmission totally disengages, perform the following:

(1) Release the engine retarder.

(2) Upshift the transmission to the next higher gear (for example, if you are in 10th gear, you would upshift to 11th gear).

(3) Apply the service brakes one time to slow the vehicle speed and help regain control of the vehicle.

e. If the transmission totally disengages from the engine due to a shift being made with the engine retarder applied and the engine speed has returned to low idle freewheeling, accelerate the engine to reengage the transmission.

f. If you experience a total loss of braking due to heat buildup--

(1) Apply the engine retarder (place switch in high mode).

(2) Upshift as the engine speed approaches 2100 rpm. Before each upshift, release the engine retarder.

(3) In 16th gear, continue to apply the engine retarder and maintain directional control of the vehicle.

4. The instructors must emphasize and reemphasize the importance of the proper downhill braking procedures and the use of the engine retarder especially on slippery surfaces as outlined above and must instill in the drivers that if these procedures are not followed death or serious injury can result.

5. Also the instructors must explain to the students that braking ability and braking techniques are different when loaded 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: LOAD A SEMITRAILER

TASK NUMBER: 551-721-3345 (Load tracked/wheeled vehicles onto a heavy-equipment transporter [HET])

A. TRAINING OBJECTIVE.

TASK: Load an M172A1 or an M870 semitrailer.

CONDITION: Given instruction, a DD Form 1970, a DA Form 2404, a pencil, TM 9-2320-273-10 for the M916/M920 tractor, TM 9-2330-211-14P, TM 55-3805-262-14 for the M172A1 semitrailer or TM 5-2330-360-14P, TM 55-2410-234-14 for the M870 semitrailer, equipment records folder, rags, lubricants, coolant, an M916 LET coupled to an M172A1 semitrailer or an M920 MET coupled to an M870 semitrailer with BII, a load, and a suitable training area.

STANDARDS: Load an M172A1 semitrailer or an M870, in the proper sequence and follow all safety precautions without damage to equipment or injury to personnel.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Motor pool or suitable training area.
3. Training type: Demonstration and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the demonstration and one instructor for every two students for the practical exercise.
6. Training aids and equipment: Hearing protection, work gloves, rags, lubricants, and coolant. DA Form 2404, DD Form 1970, pencil, TM 9-2320-273-10 for the M916/M920 tractor, TM 9-2330-211-14P and TM 55-3805-262-14 for the M172A1 semitrailer or TM 5-2330-360-14P and TM 55-2410-234-14 for the M870 semitrailer, equipment records folder, an M916 LET coupled to an M172A1 semitrailer or an M920 MET coupled to an M870 semitrailer and BII for every two students. An MW24C bucket loader as a load for the M172A1 semitrailer and a D8K caterpillar as a load for the M870 semitrailer. Slow moving sign for rear of vehicle.

7. References: AR 385-30, FM 21-60, TM 5-2330-360-14P, TM 9-2320-273-10, TM 9-2330-211-14P, TM 55-2410-234-14, TM 55-3805-262-14.

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 procedures for winching a piece of nonoperational equipment onto/off of a semitrailer is being developed at the present time and will be published and distributed at a later date. The procedures below are for loading a piece of equipment that can either be driven onto the M172A1 or the M870 semitrailer under its own power or that will be loaded by a crane that has the capability to lift the equipment onto the semitrailer.

- a. Align the tractor M916 and M172A1 semitrailer as close as possible (6 feet or less) to the equipment to be loaded on as level ground as possible. On the M920 tractor and M870 semitrailer, the semitrailer must be uncoupled from the tractor and the gooseneck lowered to the ground unless the equipment is going to be loaded onto the semitrailer using a crane.

NOTE: Be sure to use ground guides when backing the vehicle.

- b. Preparation of tractor (M916).
 - (1) Apply the parking brakes by pulling out the parking brake control.
 - (2) Place the transmission ratio selector in neutral (N).
 - (3) Place one chock block in front of the rear dual tires and one chock block in the rear of the rear dual tires.

c. Preparation of the (M172A1) semitrailer by the driver and crew.

- (1) Chock wheels on both sides of the semitrailer--one in front of outer forward wheel and tire assembly and one behind the outer rear wheel and tire assembly.
- (2) Disconnect and remove lashing chains and load binders from the loading ramps and wheel covers on the bed of the semitrailer.
- (3) Pick up and carry the two loading ramps by the handles and place into position at the rear of the semitrailer.
- (4) Place and secure loading ramps onto ramp clips. Adjust ramps to the width of the equipment being loaded.
- (5) Place the four wheel covers over the four wheel openings.
- (6) Remove all BII from the stowage compartment.

d. Preparation of the M870 semitrailer by the driver and crew.

NOTE: The M920s winch is used to lower the M870 semitrailers gooseneck to the ground and then must be moved out of the way during the drive-on loading operation.

WARNING

Always wear heavy gloves when handling cable. Never allow the cable to run through hands.

CAUTION

Never operate the winch with less than four turns of the cable on the drum.

WARNING

Always wear hearing protection at cab and winch operator's station.

WARNING

During the winching operations, the winch operator and guides must know the correct hand signals as defined in FM 21-60.

WARNING

All personnel not involved in the winching and loading operation will stand clear of the semitrailer, winch cables, and payload.

- (1) Connect the M920 tractor's winch cable to the semitrailer's gooseneck.
 - (2) Put tension on winch cable.
 - (3) Remove lock pins.
 - (4) Lower the gooseneck to the ground and disconnect the winch cable.
- e. Operator takes up the winch cable while the crewmember watches the drum to make sure the cable winds evenly on the drum without tangles, kinks, or twists. Cable coils should be tight and close together on the drum.
- f. Operator directs crew member to signal when enough slack has been taken up to prevent the cable from unwinding over the drum flanges when attached to the anchor. Operator stops the winch and directs crewmember to bolt cable clevis to the anchor.
- g. Operator disengages winch controls.
- h. Operator follows normal winch shutdown procedures.
- i. Driver moves M920 tractor out of the loading area.

NOTE: At no time during the loading operation should personnel be on the semitrailer bed.

NOTE: Use extreme caution when loading/driving equipment on the semitrailer. For safety, post crewmembers as guides (one on each side of the semitrailer). The equipment (being loaded) operator must obey hand signals from the primary ground guide (left [driver] side of semitrailer). The guide on the right [passenger] side relays signals to the guide on the left side of the semitrailer unless in an emergency situation. The ground guides will move forward as the load is moved forward on the M172A1 and rearward on the M870 semitrailer. Ground guides will keep visual contact with each other and with the equipment (being loaded) operator at all times.

- j. Scoop loader driven onto and tied down to the M172A1 semitrailer.
- (1) Ensure ramps are adjusted to the width of the scoop loader.
 - (2) Slowly drive the scoop loader up the ramps.
 - (3) Move the scoop loader forward until its front tires are slightly past the center of the second tie-down ring on the semitrailer.
 - (4) Place chock blocks in front of the front tires and to the rear of the rear tires. Nail in place with one 20d, two 60d, and three 40d nails in the heel

and one 40d nail in each side of the block. Do not drive the nails completely into the blocks; leave about an inch sticking out. It will be easier to remove them during the unloading operation.

- (5) Attach one shackle to each of the front tie-down and lifting provision.
- (6) Attach one chain to the shackle on the left front tie-down provision and to the right front trailer tie-down ring.
- (7) Attach one chain to the shackle on the right front tie-down provision and to the left front trailer tie-down ring.
- (8) Attach one chain to the shackle on the left front lifting provision and to the left trailer gooseneck tie-down ring.
- (9) Attach one chain to the shackle on the right front lifting provision and to the right trailer gooseneck tie-down ring.
- (10) Attach one chain to the left rear tie-down provision and to the right rear trailer tie-down ring.
- (11) Attach one chain to the right rear tie-down provision and to the left rear trailer tie-down ring.
- (12) Attach one chain to the left rear tie-down provision and to the left side trailer tie-down ring.
- (13) Attach one chain to the right rear tie-down provision and to the right side trailer tie-down ring.
- (14) Attach one load binder to each chain and tighten.

k. D8K caterpillar being driven onto and tied down to the M870 semitrailer.

- (1) Drive the D8K slowly up the front ramp toward the rear of the semitrailer until the blade rests on the slanted rear ramp.
- (2) Position the D8K so that the center of the fourth roller is located 122 inches from the intersection of the gooseneck and the trailer deck.
- (3) Set the parking brake on the D8K.
- (4) Using the winch, raise and secure the gooseneck in the travel position.
- (5) Couple semitrailer to tractor.

- (6) Lower the ripper shank from the extreme up position until it makes contact with the trailer gooseneck.
- (7) Make sure there is contact between the outrigger plank and the D8K tractor tracks.
- (8) Attach clevis to first tie-down ring on the semitrailer.
- (9) Attach upper rear track carrier roller support assembly to the second tie-down ring.
- (10) Attach upper rear carrier roller support assembly down behind the push beam to the third tie-down ring.
- (11) Attach forward carrier roller support assembly down behind the push beam to the fourth tie-down ring.
- (12) Attach front tow track to the fifth tie-down ring.
- (13) Repeat these tie-down procedures on the opposite side of the semitrailer.
- (14) Attach two tie-down chains to the ripper shanks crisscross and attach to the tie-down rings on the semitrailer gooseneck.

NOTE: Crossing the chains will prevent the payload from shifting during travel.

- (15) Keep speed between 18-20 mph maximum (slower when weather and road conditions are less than ideal).

NOTE: Crewmembers check the tires on the semitrailer.

3. Practical exercise:

- a. Assign students to vehicles and issue TM 9-2320-273-10 for the M916/M920 tractor, TM 9-2330-211-14P and TM 55-3805-262-14 for the M172A1 semitrailer or TM 5-2330-360-14P and TM 5-2410-234-14 for the M870 semitrailer, 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 on tractor and semitrailer according to the appropriate TMs.
- c. Students practice loading the semitrailer in the training area (see Chapter 4, Figure 4-5).

4. Evaluate: Check each student's performance on PMCS and on the procedures for loading a scoop loader or a D8K caterpillar.

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 the vehicle is parked.
2. Always place the transmission in neutral, set the parking brake (except in extreme cold), and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Always use ground guides when backing the vehicle.
6. Always wear hearing protection when working in or around a running vehicle.
7. Always wear heavy gloves when handling cable. Never allow the cable to run through hands.
8. Ensure that all personnel not involved in the winching operation stand clear of the winch cables and payload.
9. Direct personnel not to walk behind the equipment during loading operations. The load may roll back causing death or serious injury.

NOTE: At no time during the loading operation should personnel be on the semitrailer bed.

10. Ensure that the winch operator and guides know the correct hand and arm signals used in the winching operations as defined in FM 21-60.

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11. Use extreme caution when winching and post crewmembers as guides (one on each side of semitrailer). The winch operator must obey hand signals from the primary ground guide left (driver's side of semitrailer). The guide on the right (passenger's side) relays signals to the guide on the left side of the semitrailer unless in an emergency situation. The ground guides will keep visual contact with each other and with the winch operator at all times.

13. Never operate the winch with less than four wraps of cable on the drum.

14. Check the tire inflation on the tractor and semitrailer.

15. Get a slow moving sign for the rear of your vehicle with NSN 9905-01-057-3894. It's required by paragraph 3-13 of AR 385-30 for slow moving vehicles operating 25 mph or less on public highways in CONUS. Use Appendix A of CTA 50-970 as your authority to order it.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 4 hours (.5 demonstration and 3.5 practical exercise including .5 PMCS).

LESSON TITLE: BACK A LOADED VEHICLE

TASK NUMBER: 551-721-1367 (Back vehicle with semitrailer)

A. TRAINING OBJECTIVE.

TASK: Back an M916 LET coupled to a loaded M172A1 or an M920 coupled to a loaded M870 semitrailer.

CONDITION: Given instruction, a DD Form 1970, a DA Form 2404, a pencil, TM 9-2320-273-10, equipment records folder, rags, lubricants, coolant, a suitable training area, a LET coupled to a loaded M172A1 or a MET coupled to a loaded M870 semitrailer and BII.

STANDARDS: Back in a straight line into an alley 16 feet wide and 50 feet long using ground guides without causing damage to equipment or injury to personnel. Interpret correct hand and arm signals as given by a ground guide. Students will be graded on a Go/No-Go basis.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Motor park and training area as scheduled.
3. Training type: Demonstration and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the demonstration and one instructor for every two students for the practical exercise.
6. Training aids and equipment: Hearing protection; rags; lubricants; coolant; and traffic cones, empty POL drums, or barricades. DA Form 2404, DD Form 1970, pencil, TM 9-2320-273-10, equipment records folder, an M916 coupled to a loaded M172A1 semitrailer, or an M920 coupled to a loaded M870 semitrailer, and BII for every two students.
7. References: TM 9-2320-273-10, FM 55-30, and FM 21-305.

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. Explain ground guide safety precautions for backing the tractor semitrailer combination. Also explain correct hand and arm signals as outlined in FM 21-305.
- b. Demonstrate backing in a straight line into an alley 16 feet wide and 50 feet long without the vehicle or semitrailer drifting into the outer boundary or bumping into the rear boundary (see Chapter 4, Figures 4-2 and 4-4 for example of training area). Place the transmission in R1 so the vehicle moves at a slower speed when backing with a heavy load or due to congestion or other hazards.
- c. Explain alignment of tractor and semitrailer; always try to sight side (driver side) back.
- d. Check to rear to ensure that the way is clear. Walk behind the vehicle before backing to ensure there is adequate clearance, check clearance on each side, check the top to ensure there is adequate clearance, and then check under the vehicle.
- e. Ensure that backup alarm switch is in the normal position unless in a quiet zone. Sound horn, flash lights to warn others that your truck is about to back.
- f. Turn on four way flashers to warn others that your truck is backing.
- g. Ensure proper use and alignment of both outside rearview mirrors to check path and clearance while backing.
- h. Explain steering.
 - (1) Oversteering (turning steering wheel too much too quickly).

(2) Turning the steering wheel to the left makes the rear of the semitrailer go to the right.

(3) Turning the steering wheel to the right makes the rear of the semitrailer go to the left.

i. Describe objects to monitor while backing.

(1) Both sides.

(2) Clearance to the front.

(3) Clearance to the rear.

(4) Overhead clearance.

j. Back slowly and use idle speed; recommended speed is 5 mph or less.

k. If necessary, realign the tractor semitrailer as many times as needed.

l. Keep window open and radio (if equipped) off.

m. Explain the difference in the response of the semitrailer when empty and when loaded.

n. Explain that the driver is still responsible for results (damage).

3. Practical exercise:

a. Assign students to vehicles and issue TM 9-2320-273-10, 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 backing the loaded tractor semitrailer combination through the course laid out in the training area (see Chapter 4, Figures 4-2 and 4-4). During-operation PMCS is also conducted at this time.

NOTE: The success of this driver training program is the ability of the instructors to get in the cab of the truck with the student driver and pass on valuable experience and proper driving techniques. Now is the time to correct any bad driving habits.

4. Evaluate: Check each student's performance on PMCS and backing.

5. Summary:

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

6. Retraining: Retrain and retest No-Gos. No-Gos will be retrained and retested after normal duty hours.

E. SAFETY RESTRICTIONS.

1. Ensure that all chock blocks are in place when the vehicles are parked.
2. Always place the transmission in neutral, set the parking brake, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Always use ground guides when backing the LET or MET.
6. Maintain a safe following distance and the speed limit when driving in the training area (as determined by the local command).
7. Always wear hearing protection when working in or around a running LET or MET.
8. Do not shift the transfer case (differential lock/unlock) control lever to the lock position while the vehicle is moving.
9. Ensure that the driver and ground guide know and understand the hand and arm signals as outlined in FM 21-305.
10. Never back up at a speed over 5 mph.
11. Ensure personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 5.5 hours (.5 demonstration and 5.0 practical exercise including .5 PMCS).

LESSON TITLE: DRIVE A LOADED VEHICLE ON IMPROVED (PRIMARY) ROADS

TASK NUMBER: 551-721-3337 (Drive a heavy-equipment transporter [HET] on improved roads)

A. TRAINING OBJECTIVE.

TASK: Drive an M916 (LET) with a loaded M172A1 or an M920 (MET) with a loaded M870 semitrailer on improved (primary) roads.

CONDITION: Given instruction, a DD Form 1970, a DA Form 2404, a pencil, TM 9-2320-273-10, equipment records folder, rags, lubricants, coolant, a suitable driving/training area, designated driving route, and a LET coupled to a loaded M172A1 semitrailer or a MET coupled to a loaded M870 semitrailer. BII for the tractor and semitrailer.

STANDARDS: Drive the designated route using defensive driving (accident avoidance) methods; make right and left turns, make gradual steering corrections, signal intentions in advance, pass oncoming vehicles, maintain vehicle interval, obey highway warning and regulatory signs, operate the light switch, 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 (use of the engine retarder [Jacobs brake]) and backing using ground guides without causing damage to equipment or injury to personnel.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Training area and designated driving routes as scheduled.
3. Training type: Demonstration and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every two students for the practical exercise.
6. Training aids and equipment: Hearing protection, rags, lubricants, and coolant. DA Form 2404, DD Form 1970, pencil, TM 9-2320-273-10, equipment records folder, designated

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route strip map, a LET coupled to a loaded M172A1 semitrailer or a MET coupled to a loaded M870 semitrailer, and BII for every two students. Wide load ahead and wide load follows signs. Slow moving sign for rear of vehicle. Escort/control vehicles are required (minimum of 2 vehicles recommended). Recommend a communication system for the control vehicles.

7. References: AR 385-30, TM 9-2320-273-10, FM 55-312, and FM 21-305.

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: Instruments, controls, indicators, and basic driving techniques have been covered in previous instruction. The instructor may need to reinforce these subjects.

NOTE: If gauges or indicators show any abnormal conditions, bring the truck to a safe stop, shut down the engine, and notify organizational maintenance.

- a. Explain putting the vehicle in motion--
 - (1) On flat roadway.
 - (2) On upgrades.
 - (3) On downgrades.
 - (4) In sand, snow, and on ice.
 - (5) When signaling intentions.
 - (6) With transmission gear ranges.

b. Explain the procedures for braking when--

- (1) Using the engine retarder (Jacobs brake)(see the information sheet at the end of this lesson).
- (2) Using the service brakes.
- (3) Driving on flat roadway.
- (4) Going downhill.
- (5) Driving on sand, snow, ice, and wet surfaces.
- (6) Using emergency braking procedures.
- (7) Downshifting the transmission.

c. Explain maneuvering the vehicle--

- (1) On curves.
- (2) At intersections.
- (3) At turns.
- (4) When steering the vehicle.
- (5) When making gradual steering corrections.
- (6) To avoid abrupt steering movements.

d. Explain changing lanes:

- (1) Signal intentions.
- (2) Check mirrors.

e. Explain the differential lockup mechanism.

CAUTION

Do not move the driveline locking system lock to the lock position while the truck is turning a corner or if the tires are slipping. It is recommended that the truck be stopped before locking the differentials.

g. Explain the following:

- (1) Steering the vehicle through a constant curve.
- (2) Maneuvering through a U-turn.
- (3) Passing stationary and moving vehicles (on narrow roads).

h. Give safety briefing (see sample convoy/ controller briefing at the end of this lesson).

i. Explain ground guide safety precautions for backing the tractor semitrailer combination.

3. Practical exercise:

NOTE: The instructor must emphasize and reemphasize the difference when braking with a load and without a load especially downhill or on slippery surfaces.

a. Assign students to vehicles and issue TM 9-2320-273-10, 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 maneuvering the vehicle through the courses laid out in the training area(s). See Chapter 4, Figures 4-2 and 4-3. Once the student is comfortable with the feel of the LET/MET and the instructor is confident with the student's driving abilities and knowledge, the student should be permitted to drive on the road with a qualified instructor.

d. After students demonstrate proficiency maneuvering the vehicle, they should practice downhill braking.

NOTE: During-operation PMCS is also conducted at this time.

NOTE: The success of this driver training program is the ability of the instructors to get in the cab of the truck with the student driver and pass on valuable experience and proper driving techniques. Now is the time to correct any bad driving habits.

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

4. Evaluate: Check each student's performance on 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 the vehicles are parked.
2. Always place the transmission in neutral, set the parking brake, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Always use ground guides when backing the LET/MET.
6. Maintain a safe following distance and speed limit when driving in the training area (as determined by the local command).
7. Always wear hearing protection when working in or around a running LET/MET.
8. Ensure that personnel wear seat belts (if equipped) when the vehicle is in motion.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 38 hours (1 demonstration and 37 practical exercise including 5 hour PMCS).

SAMPLE ESCORT/CONTROLLER'S BRIEFING SHEET

1. Always follow civilian/military police instructions when given.
2. On controlled access highways, use truck-parking areas only.
3. Make only emergency halts on the roadside of controlled access highways.
4. Do not stand on the traffic side of a vehicle during halts on conventional highways.
5. Perform vehicle operation maintenance and check cargo security at every halt.
6. Move vehicles off the highway before beginning maintenance.
7. Have reflectors and warning devices in place before beginning maintenance.
8. Use warning lights during periods of darkness or reduced visibility.
9. Begin movement only at the escort/controllers signal.
10. Observe vehicle speed restrictions: _____ as determined by the local commander.
11. Observe vehicle intervals (minimums):
 - a. Controlled access highway - 200 yards.
 - b. Rural conventional highway - 150 yards.
 - c. Urban conventional highway - 50 yards.
 - d. Blackout conditions - 60 to 180 feet.
12. Use the acceleration lane, when available, to reach highway speed.
13. Gradually attain proper vehicle interval once on the main route.
14. Operate all vehicles with headlights on at all times (except when under blackout conditions).
15. Use warning devices correctly.
16. Remember the following: Because of the weight of the M916/M920 combination, roadways and curbs may give way, causing the vehicle to turn over. When approaching oncoming traffic on a narrow road--
 - a. Signal your intentions.
 - b. Move to the right of the roadway only as far as you safely can and stop.
 - c. Wait until the other vehicles have passed and resume travel on the most solid part of the road.
17. Add any additional comments as local conditions warrant.

ENGINE RETARDER (JACOBS BRAKE) INFORMATION SHEET

1. The M916/M920 series equipment transporters are equipped with a retarder system that enables the engine to act as a brake. Use the engine retarder for descending grades in city traffic 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 retarder is most effective between 1750-2000 rpm.

2. Do not use the engine retarder in first, second, or third gears, except when descending steep grades. Never allow the engine speed to drop below 1200 rpm with the engine retarder applied. This will cause serious transmission damage. Do not engage the engine retarder when shifting or when the transmission is in neutral.

3. The following procedures should be followed when **THE TOWING VEHICLE TIRES HAVE GOOD TRACTION**:

a. Select a gear that will allow the engine with the engine retarder applied to control the truck speed with the engine at or below 2000 rpm and service brakes not applied. This means as you approach a downgrade, progressively select a gear that when combined with the engine retarder will allow you to maintain an engine speed of 1750-2000 rpm.

b. As engine speed exceeds 2000 rpm, apply the service brakes one time to slow the engine speed to 1650 rpm, release the engine retarder, downshift one gear (example if you are in 10th gear you would downshift to 9th gear) and reapply the engine retarder. Repeat this procedure until you can maintain the engine speed between 1750-2000 rpm.

c. If the engine over speeds (above 2100 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.

d. If the transmission over speeds (above 2300 rpm) and the transmission totally disengages, perform the following:

(1) Release the engine retarder.

(2) Upshift the transmission to the next higher gear (for example, if you are in 10th gear, you would upshift to 11th gear).

(3) Apply the service brakes one time to slow the vehicle speed and help regain control of the vehicle.

e. If the transmission totally disengages from the engine due to a shift being made with the engine retarder applied and the engine speed has returned to low idle freewheeling, accelerate the engine to reengage the transmission.

f. If you experience a total loss of braking due to heat buildup--

(1) Apply the engine retarder (place switch in high mode).

(2) Upshift as the engine speed approaches 2100 rpm. Before each upshift, release the engine retarder.

(3) In 16th gear, continue to apply the engine retarder and maintain directional control of the vehicle.

4. The instructors must emphasize and reemphasize the importance of the proper downhill braking procedures and the use of the engine retarder especially on slippery surfaces as outlined above and must instill in the drivers that if these procedures are not followed death or serious injury can result.

5. Also the instructors must explain to the students that braking ability and braking techniques are different when loaded 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: UNLOAD A SEMITRAILER

TASK NUMBER: 551-721-3346 (Unload tracked/wheeled vehicles off a heavy-equipment transporter [HET])

A. TRAINING OBJECTIVE.

TASK: Unload a scoop loader off an M172A1 semitrailer or a caterpillar off an M870 semitrailer.

CONDITION: Given instruction, a DD Form 1970, a DA Form 2404, a pencil, TM 9-2320-273-10 for the M916/M920 tractor, TM 9-2330-211-14P and TM 55-3805-262-14 for the M172A1 semitrailer or TM 5-2330-360-14P and TM 55-2410-234-14 for the M870 semitrailer, equipment records folder, rags, lubricants, coolant, an M916 LET coupled to an M172A1 semitrailer or an M920 MET coupled to an M870 semitrailer with BII, a load, and a suitable training area.

STANDARDS: You must unload an M172A1 semitrailer or an M870 in the proper sequence and follow all safety precautions without causing damage to equipment or injury to personnel.

B. INTERMEDIATE TRAINING. None.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Motor park and training area.
3. Training type: Demonstration and practical exercise.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the conference and one instructor for every two students for the practical exercise.
6. Training aids and equipment: Hearing protection, work gloves, rags, lubricants, and coolant. DA Form 2404, DD Form 1970, pencil, TM 9-2320-273-10 for the M916/M920 tractor, TM 9-2330-211-14P and TM 55-3805-262-14 for the M172A1 semitrailer or TM 5-2330-360-14P and TM 55-2410-234-14 for the M870 semitrailer, equipment records folder, an M916 LET coupled to an M172A1 semitrailer or an M920 MET coupled to an M870 semitrailer, and BII for every two students. An MW24C bucket loader as a load for the M172A1 semitrailer and a D8K caterpillar as a load for the M870 semitrailer. Slow moving sign for the rear of the vehicle.

7. References: AR 385-30, FM 21-60, TM 5-2330-360-14P, TM 9-2320-273-10, TM 9-2330-211-14P, TM 55-2410-234-14, TM 55-3805-262-14.

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 procedures for winching a piece of nonoperational equipment off of a semitrailer is being developed at the present time and will be published and distributed at a later date. The procedures below are for unloading a piece of equipment that can either be driven off of the M172A1 or the M870 semitrailer under its own power or that will be unloaded by a crane that has the capability to lift the equipment onto the semitrailer.

- a. Align the tractor M916 and M172A1 semitrailer as close as possible to the area that the equipment is to be unloaded at and on as level ground as possible. On the M920 tractor and M870 semitrailer, the semitrailer must be uncoupled from the tractor and the gooseneck lowered to the ground unless the equipment is going to be unloaded off the semitrailer using a crane.

SAFETY NOTE: Be sure to use ground guides when backing the vehicle.

- b. Preparation of tractor (M916).
 - (1) Apply the parking brakes by pulling out the parking brake control.
 - (2) Place the transmission ratio selector in neutral (N).
 - (3) Place one chock block in front of the rear dual tires and one chock block in the rear of the rear dual tires.

c. Preparation of the M172A1 semitrailer by the driver and crew.

- (1) Chock wheels on both sides of the semitrailer as follows: one in front of outer forward wheel and tire assembly and one behind the outer rear wheel and tire assembly.
- (2) Place and secure loading ramps onto ramp clips. Adjust ramps to the width of the equipment being unloaded.
- (3) Remove chock blocks from the front and rear tires of the scoop loader.
- (4) Release and remove all tie-down chains. Then the scoop loader operator slowly backs the scoop loader off the semitrailer and down the ramps.

SAFETY NOTE: At no time during the unloading operation should personnel be on the semitrailer bed.

SAFETY NOTE: Use extreme caution when unloading and driving equipment off the semitrailer. For safety, post crewmembers as guides (one on each side of the semitrailer). The equipment (being unloaded) operator must obey the hand signals from the primary ground guide, the one on the left (driver) side of the semitrailer. The guide on the right (passenger) side relays signals to the guide on the left side of the semitrailer unless in an emergency situation. The ground guides will move rearward as the load is moved rearward on the (M172A1) and forward on the (M870) semitrailer. The ground guides will keep visual contact with each other and with the equipment (being unloaded) operator at all times.

(d) Preparation of the M870 semitrailer by the driver and crew.

NOTE: The M920's winch is used to lower the M870 semitrailers gooseneck to the ground and then must be moved out of the way during the drive on loading operation.

WARNING

Always wear heavy gloves when handling cable. Never allow the cable to run through hands.

CAUTION

Never operate the winch with less than four turns of cable on the drum.

WARNING

Always wear hearing protection at the cab and winch operator's station.

WARNING

During the winching operations, the winch operator and guides must know the correct hand signals as defined in FM 21-60.

WARNING

All personnel not involved in the winching and unloading operation will stand clear of the semitrailer, winch cables, and payload.

- (1) Connect the M920 tractor's winch cable to the semitrailer's gooseneck.
 - (2) Put tension on the winch cable.
 - (3) Remove the lock pins.
 - (4) Lower the gooseneck to the ground and disconnect the winch cable.
- e. Operator takes up winch cable while crewmember watches the drum to make sure the cable winds evenly on the drum without tangles, kinks, or twists. Cable coils should be tight and close together on the drum.
 - f. Operator directs crew member to signal when enough slack has been taken up to prevent cable from unwinding over drum flanges when attached to anchor. Operator stops winch and directs crewmember to bolt cable clevis to anchor.
 - g. Operator disengages winch controls.
 - h. Operator follows normal winch shutdown procedures.
 - i. Driver moves M920 tractor out of the unloading area.
 - j. Release and remove all tie-down chains.
 - k. Raise the ripper shank to the extreme position.
 - l. D8K operator starts engine, releases parking brake, and slowly back dozer off semitrailer.
 - m. Preparing the M172A1 semitrailer for travel.
 - (1) Install loading ramps and wheel covers in the stowed position.

- (2) Secure loading ramps and wheel covers with lashing chains and binders.
- (3) Check that all BII are stowed properly on the semitrailer.
- (4) Use the towing vehicle controls and check that the semitrailer brakes and lights are operating.
- (5) Remove the chock blocks from the semitrailer wheels.

n. Preparing the M870 for travel.

- (1) Connect the M920 tractors winch cable to the semitrailer's gooseneck.
- (2) Raise the gooseneck from the ground and install the lock pins.
- (3) Disconnect the winch cable.

o. Operator takes up the winch cable while the crewmember watches the drum to make sure the cable winds evenly on the drum without tangles, kinks, or twists. Cable coils should be tight and close together on the drum.

p. Operator directs crew member to signal when enough slack has been taken up to prevent cable from unwinding over drum flanges when attached to the anchor. Operator stops winch and directs crewmember to bolt cable clevis to anchor.

q. Operator disengages winch controls.

r. Operator follows normal winch shutdown procedures.

s. Driver couples M920 tractor to the semitrailer.

3. Practical exercise:

a. Assign students to vehicles and issue TM 9-2320-273-10 for the M916/M920 tractor, TM 9-2330-211-14P and TM 55-3805-262-14 for the M172A1 semitrailer or TM 5-2330-360-14P and TM 55-2410-234-14 for the M870 semitrailer, pencils, DA Form 2404, DD Form 1970, and equipment records folder. Instruct students on the location of rags, lubricants, and coolant. See Chapter 4, Figure 4-5.

b. Students perform before-operation PMCS on tractor and semitrailer according to the appropriate operator TMs.

4. Evaluate: Check every student's performance on PMCS and the procedures for unloading a scoop loader or D8K caterpillar.

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 the vehicle is parked.
2. Always place the transmission in neutral, set the parking brake (except in extreme cold), and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Always use ground guides when backing the vehicle.
6. Always wear hearing protection when working in or around a running vehicle.
7. Always wear heavy gloves when handling cable. Never allow cable to run through hands.
8. Ensure that all personnel not involved in the winching operation stand clear of the winch cables and payload.

NOTE: At no time during unloading operation should personnel be on the semitrailer bed.

9. Ensure that the winch operator and guides know the correct hand signals used in the winching operations.
10. Use extreme caution when winching/driving equipment onto/off the semitrailer. For safety, post crewmembers as guides (one on each side of the semitrailer). The winch operator must obey hand signals from the primary ground guide on the left (driver) side of the semitrailer. The guide on the right (passenger) side relays signals to the guide on the left side of the semitrailer unless in an emergency situation.

11. Check the tire inflation on the tractor and semitrailer.

12. Get a slow moving sign for the rear of your vehicle with NSN 9905-01-057-3894. It's required by paragraph 3-13 of AR 385-30 for slow moving vehicles operating 25 mph or less on public highways in CONUS. Use Appendix A of CTA 50-970 as your authority to order it.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended instructional time is 4 hours (1 demonstration and 3 practical exercise includes .5 hour of PMCS).

Section II

End Of Course Comprehensive Test

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, a DD Form 1970, a DA Form 2404, a pencil, a TM 9-2320-273-10 for the M916/M920 tractor, TM 9-2330-211-14P and TM 55-3805-262-14 for the M172A1 semitrailer or TM 5-2330-360-14P and TM 55-2410-234-14 for the M870 semitrailer, an equipment records folder, rags, lubricants, coolant, a suitable training area, road test route, an M916 (LET) coupled to M172A1 semitrailer loaded with a scoop loader, or an M920 (MET) coupled to an M870 semitrailer loaded with a D8K caterpillar, and BII.

STANDARDS: Answer correctly 21 of 30 questions on the written examination, pass the driver's road test with a score of 70 or higher, and load/unload the equipment off the semitrailer and receive all Gos on the checklist.

B. INTERMEDIATE TRAINING.

Intermediate Training Objective 1

TASK: Pass a written examination

CONDITION: Given an examination booklet and a pencil.

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

Intermediate Training Objective 2

TASK: Pass the driver's road test.

CONDITION: Given a DD Form 1970, a DA Form 2404, a pencil, a TM 9-2320-273-10 for the M916/M920 tractor, TM 9-2330-211-14P

and TM 55-3805-262-14 for the M172A1 semitrailer or TM 5-2330-360-14P and TM 55-2410-234-14 for the M870 semitrailer, an equipment records folder, rags, lubricants, coolant, a suitable training area, road test route, an M916 (LET) coupled to M172A1 semitrailer loaded with a scoop loader, or an M920 (MET) coupled to an M870 semitrailer loaded with a D8K caterpillar, and BII.

STANDARDS: Achieve a score of 70 or higher. Use the driver's performance test (road test) instructions and the driver's road test checklist.

Intermediate Training Objective 3

TASK: Load/unload a scoop loader onto/off the M172A1 semitrailer or a D8K caterpillar onto/off the M870 semitrailer.

CONDITION: Given a DD Form 1970, a DA Form 2404, a pencil, a TM 9-2320-273-10 for the M916/M920 tractor, TM 9-2330-211-14P and TM 55-3805-262-14 for the M172A1 semitrailer or TM 5-2330-360-14P and TM 55-2410-234-14 for the M870 semitrailer, an equipment records folder, rags, lubricants, coolant, a suitable training area, road test route, an M916 (LET) coupled to M172A1 semitrailer loaded with a scoop loader, or an M920 (MET) coupled to an M870 semitrailer loaded with a D8K caterpillar, and BII.

STANDARDS: Load/unload a scoop loader onto/off the M172A1 semitrailer or a D8K caterpillar onto/off the M870 semitrailer in the proper sequence, follow all safety precautions without causing damage to equipment or injury to personnel, and receive all Gos on the performance test checklist.

C. ADMINISTRATIVE INSTRUCTIONS.

1. When training will be given: As scheduled.
2. Training location: Classroom, motor park, road test route, and training area as scheduled.
3. Training type: Performance evaluation.
4. Who will be trained: Personnel as scheduled.
5. Principal and assistant instructors required: One instructor for the class for the written test and one instructor for every student for the performance tests.

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6. Training aids and equipment: Examination booklet, a DD Form 1970, a DA Form 2404, a pencil, rags, lubricants, coolant, TM 9-2320-273-10 for the M916/M920 tractor, TM 9-2330-211-14P and TM 55-3805-262-14 for the M172A1 semitrailer or TM 5-2330-360-14P and TM 55-2410-234-14 for the M870 semitrailer, an equipment records folder, a scoop loader or a D8K caterpillar, an M916 tractor with an M172A1 or an M920 tractor with an M870 semitrailer and BII.

7. References: TM 9-2320-273-10, TM 9-2330-211-14P, TM 5-2330-360-14P, TM 55-2410-234-14, TM 55-3805-262-14, DA Pamphlet 738-750, and FM 21-305.

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. Administer the written examination.
- b. Administer performance tests. This will be accomplished by using the drivers performance test instructions and performance test checklists.

3. Evaluate: Check performance test checklists and written test results.

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 the vehicles are parked.
2. Always place the transmission in neutral, set the parking brake, and shut off the engine before leaving the vehicle.
3. Ensure that students remove all jewelry and identification tags before performing PMCS.
4. Ensure that students pay particular attention to the cautions and warnings listed in the operator's manual.
5. Always use ground guides when backing the tractor/ semitrailer.
6. Maintain a safe following distance and speed limit when driving on the road test route (as determined by the local command and traffic control devices).
7. Always wear hearing protection when working in or around a running vehicle.
8. Ensure that all occupants wear seat belts while vehicle is in operation.

F. ADDITIONAL COMMENTS AND INFORMATION. Recommended testing time is 6 hours (.5 for the written test, 3 hours for the loading/unloading, and 2.5 hours for the road test).

INTERMEDIATE TRAINING OBJECTIVE 1

WRITTEN TEST (PRIMARY)

NAME

RANK

DATE

SECTION I. True/false questions: Read each question carefully and place a T or F on the blank line to the left.

- _____ 1. You may shift the differential lock/unlock control to the LOCK position while the vehicle is moving.
- _____ 2. Damage to the tachograph stylus will result if you operate the vehicle without a disc in the tachograph.
- _____ 3. The transmission has a neutral safety switch.
- _____ 4. It is all right to idle the engine for long periods of time.
- _____ 5. The engine retarder should not be engaged when shifting the transmission or when the transmission is in neutral.
- _____ 6. Road, load, and traffic conditions are factors in determining the transmission gear selection.

SECTION II. Multiple choice: Read each question carefully and write the answer which is MOST correct on the blank line to the left.

- _____ 7. What is the normal operating temperature range for the transmission oil as indicated by the transmission oil temperature gauge?
 - a. 20° to 40° F.
 - b. 40° to 60° F.
 - c. 40° to 220° F.
 - d. 200° to 250° F.
- _____ 8. The parking brake control--
 - a. Is pulled out to apply the parking brakes.
 - b. Is pushed in to release the parking brakes.
 - c. Charges front and rear brakes system on tractor.
 - d. Both a and b.

- _____ 9. The engine water temperature gauge should _____ read at normal operating temperature.
- 165°F to 195°F.
 - 190°F to 210°F.
 - 200°F to 230°F.
 - 210°F to 240°F.
- _____ 10. At the normal range at rated speed 2100 rpm, the engine oil pressure gauge should read--
- 40 to 75 psi.
 - 25 to 40 psi.
 - 30 to 50 psi.
 - 90 to 120 psi.
- _____ 11. The normal operating range of the battery as indicated by the voltmeter is--
- Below 11 volts (red area).
 - Above 15 volts (red area).
 - 12 to 15 volts (green area).
 - Between 11 and 12 volts (yellow area).
- _____ 12. The normal operating air pressure range as indicated by both the air pressure gauges is--
- 50 to 60 psi.
 - 60 to 80 psi.
 - 90 to 105 psi.
 - 105 to 120 psi.
- _____ 13. The red warning light (low air pressure warning light) will remain on and the buzzer will sound until--
- The break pedal is applied.
 - The air system pressure in each section of the dual system is below 60 psi.
 - The air system pressure in each section of the dual systems is between 64 and 76 psi.
 - None of the above.
- _____ 14. What happens when the differential lock/unlock control is moved to the LOCK position?
- Locks up the driveline.
 - Engages the front driving axle.
 - Only a.

d. Both a and b.

_____ 15. The transmission on the M916/M920 has forward _____ gear ranges.

- a. Sixteen.
- b. Eleven.
- c. Eight.
- d. Nine.

_____ 16. The engine retarder selection switch has how many settings?

- a. Two.
- b. Three.
- c. Four.
- d. Six.

_____ 17. The engine retarder (Jacobs brake)--

- a. Provides the maximum engine braking (6 cylinders) in the HIGH position.
- b. Should be used when descending grades and in city traffic.
- c. Is most effective between 1750-2000 rpm.
- d. Should not be used if the tires do not have good traction or when on slippery surfaces.
- e. All the above.

_____ 18. The trailer brake hand control is--

- a. Pulled down to apply trailer brakes only.
- b. Used for testing the semitrailer brakes.
- c. Not used as a parking brake.
- d. All the above.

_____ 19. After using the trailer brake hand control, return it to the OFF position--

- a. Or leave it in any position.
- b. To prevent the trailer brakes from burning.
- c. To prevent the transmission from over heating.
- d. All the above.

_____ 20. After starting the engine, what is the recommended idle rpm?

- a. 580 to 650 rpm.
- b. 800 to 950 rpm.
- c. 1100 to 1500 rpm.
- d. 1700 to 2100 rpm.

- _____ 21. The inhibitor override should only be used--
- Whenever it is needed.
 - When shifting from 1st to 5th gear.
 - When shifting from forward to reverse.
 - When the vehicle is complete stopped.
- _____ 22. What is the recommended cruising rpm range for city and highway driving?
- Not less than 1500 rpm for city driving.
 - Between 1800-1900 rpm for highway driving.
 - Both a and b.
 - Neither a nor b.
- _____ 23. When would you NOT move the differential lock/unlock control to the LOCK position?
- While the truck is moving.
 - If the tires are spinning.
 - It can be shifted at any time.
 - Both a and b.
- _____ 24. When is hearing protection required?
- Anywhere near the vehicle.
 - When the vehicle is running and you are in the cab.
 - There is no requirement for hearing protection.
 - During winching operations.
- _____ 25. In the event the transmission overspeeds (above 2300 rpm) and you have total transmission disengagement, which of the following would you do?
- Release the engine retarder.
 - Upshift the transmission.
 - Make one positive application of the service brakes to slow the vehicle speed and regain control of the vehicle.
 - All the above.
- _____ 26. The transmission is equipped so that only _____ can be shifted at a time.
- Two gears up to the 11th gear ratio.
 - One gear from 11th to the 16th position.
 - None of the above.
 - Both a and b.
- _____ 27. Never let your vehicle coast in neutral because--

- a. It will severely damage the transmission.
- b. You lose engine braking action.
- c. Only a.
- d. Both a and b.

_____ 28. Run the engine at _____ no load for 3 minutes before shutting the engine down to allow the turbocharger to cool down.

- a. 400 to 450 rpm.
- b. 475 to 800 rpm.
- c. 500 to 900 rpm.
- d. 550 to 650 rpm.

_____ 29. When the tractor is coupled to the semitrailer, there must be no _____ between the fifth wheel plate and the fifth wheel.

- a. More than four inches of daylight.
- b. More than six inches of daylight.
- c. Daylight.
- d. None of the above.

_____ 30. There is a _____ light cable stored in the tool box under the passenger seat.

- a. 12 volt.
- b. 12 volt and 18 volt.
- c. 12 volt and 24 volt.
- d. 24 volt.

INTERMEDIATE TRAINING OBJECTIVE 1
WRITTEN TEST ANSWER SHEET (PRIMARY)

1.	F	11.	C	21.	D
2.	T	12.	D	22.	C
3.	T	13.	B	23.	D
4.	F	14.	D	24.	D
5.	T	15.	A	25.	D
6.	T	16.	B	26.	D
7.	C	17.	E	27.	D
8.	D	18.	D	28.	D
9.	A	19.	B	29.	C
10.	A	20.	A	30.	C

INTERMEDIATE TRAINING OBJECTIVE 1

WRITTEN TEST (ALTERNATE)

NAME

RANK

DATE

SECTION I. True/false questions: Read each question carefully and place a T or F on the blank line to the left.

- _____ 1. The neutral safety switch will allow the engine to start while the transmission is in any gear.
- _____ 2. It is all right to park the vehicle on a steep grade.
- _____ 3. To unlock the fifth wheel, first pull the secondary lock release handle out. Then pull the primary lock release handle out.
- _____ 4. Heavy gloves are required when working with the winch cables.
- _____ 5. There is a throttle release safety switch mounted on the winch operator's station.
- _____ 6. After prolonged engine idle or after using the PTO, it is not recommended to run the engine up to full rpm momentarily.

SECTION II. Multiple choice: Read each question carefully and write the answer which is MOST correct on the blank line to the left.

- _____ 7. The tachograph registers truck ground speed (mph/kph hand), engine speed (rpm hand), and distance traveled. It also contains which of the following:
 - a. Engine temperature hands.
 - b. Transmission temperature hands.
 - c. Radio hands
 - d. Clock hands.
- _____ 8. The transmission has _____ forward gears?
 - a. Sixteen.
 - b. Seven.
 - c. Eight.
 - d. Eleven.
- _____ 9. The engine retarder (Jacobs brake)--
 - a. Helps slow the truck on downgrades or city traffic.
 - b. Has the greatest effect in the lowest transmission gear range.

- c. Enables the engine to act as a brake.
 - d. Is used only when the throttle is closed.
 - e. All of the above.
- _____ 10. When the tractor is coupled to the semitrailer there must be no _____ between the fifth wheel plate and the fifth wheel.
- a. More than four inches of daylight.
 - b. More than six inches of daylight.
 - c. Daylight.
 - d. None of the above.
- _____ 11. The trailer brake hand control is--
- a. Pulled down to apply trailer brakes only.
 - b. Used for testing the semitrailer brakes.
 - c. Not to be used as a parking brake.
 - d. All of the above.
- _____ 12. During normal driving conditions, at engine rpm range of 1800 to 2100 rpm, the oil pressure gauge should read--
- a. 20 to 50 psi.
 - b. 40 to 75 psi.
 - c. 50 to 90 psi.
 - d. 70 to 110 psi.
- _____ 13. Normal vehicle air system air pressure for driving is--
- a. 50 to 70 psi.
 - b. 70 to 90 psi.
 - c. 105 to 120 psi.
 - d. 110 to 150 psi.
- _____ 14. The maximum governed engine speed is--
- a. 1900 rpm.
 - b. 2000 rpm.
 - c. 2100 rpm.
 - d. 2300 rpm.
- _____ 15. The engine rpm should be not less than _____ for city driving.
- a. 1000 rpm.
 - b. 1200 rpm.
 - c. 1400 rpm.

- d. 1500 rpm.
- _____ 16. Do not operate the vehicle with the pusher axle (M920) lowered--
 - a. During off-road operations.
 - b. On rough roads.
 - c. Without a payload.
 - d. All of the above.
- _____ 17. What is the determining factor(s) in selecting the transmission gear range?
 - a. Roads, loads, and traffic conditions.
 - b. Nothing specific.
 - c. Traffic conditions only.
 - d. None of the above.
- _____ 18. With the transmission in 1st position, you get--
 - a. The most pulling power.
 - b. The most engine braking.
 - c. The most engine retarder (Jacobs brake).
 - d. All of the above.
- _____ 19. Never let the vehicle coast in neutral or you will--
 - a. Severely damage the transmission.
 - b. Lose engine braking.
 - c. Neither a nor b.
 - d. Both a and b.
- _____ 20. The parking brake control is--
 - a. Pulled out to apply the parking brakes.
 - b. Pushed in to release the parking brakes.
 - c. Neither a nor b.
 - d. Both a and b.
- _____ 21. The red warning light (low air pressure warning light) will remain on and the buzzer will sound until--
 - a. The brake pedal is pushed in.
 - b. The air system pressure in each section of the dual system is between 64 and 76 psi.
 - c. The air system pressure in each section of the dual system is below 30 psi.
 - d. None of the above.

- _____ 22. The transmission _____ to warm the transmission during cold weather.
- Is equipped with a strip heater.
 - Is equipped with a Herman Nelson heater.
 - Is wrapped with double layers of insulation
 - Has nothing.
- _____ 23. When is hearing protection required?
- Anywhere near the vehicle.
 - The vehicle is running and you are in the cab.
 - There is no requirement for hearing protection.
 - During winching operations.
- _____ 24. If the engine water temperature gauge shows above 225°F, you should--
- Shut the engine off immediately.
 - Refer to the trouble shooting procedures.
 - Continue the mission.
 - Both a and b.
- _____ 25. The normal operating range as indicated by the transmission oil temperature gauge is --.
- 40°F to 220°F.
 - 100°F to 300°F.
 - 110°F to 150°F.
 - 150°F to 190°F.
- _____ 26. When stopping the vehicle with a load, you should to assist you.
- Use the engine (Jacobs brake) brake.
 - Downshift the transmission.
 - Use the service brakes.
 - All of the above.
- _____ 27. The engine retarder (Jacobs brake) should not be used--
- If it is a sunny day.
 - On slippery surfaces or if the tractor tires do not have good traction.
 - If the tires have good traction.
 - All the above.
- _____ 28. After using the trailer brake hand control, return it to the off position--
- Or leave it in any position.

- b. To prevent the the semitrailer brakes from over heating.
- c. To prevent the transmission from over heating.
- d. None of the above.

_____ 29. In what gear do you start the engine?

- a. 1st.
- b. 5th.
- c. "P."
- d. "N."

_____ 30. In the event the transmission overspeeds (above 2300 rpm) and you have total transmission disengagement,--

- a. Turn off the engine.
- b. Rapidly pump the service brake pedal.
- c. Release the engine retarder, upshift the transmission, and make one positive application of the service brakes to slow the vehicle speed and regain control of the vehicle.
- d. Jump out of the truck.

INTERMEDIATE TRAINING OBJECTIVE 1
WRITTEN TEST ANSWER SHEET (ALTERNATE)

1.	F	11.	D	21.	B
2.	F	12.	B	22.	A
3.	T	13.	C	23.	D
4.	T	14.	C	24.	D
5.	F	15.	D	25.	A
6.	F	16.	D	26.	D
7.	D	17.	A	27.	B
8.	A	18.	D	28.	B
9.	E	19.	D	29.	D
10.	C	20.	D	30.	C

INTERMEDIATE TRAINING OBJECTIVE 2

DRIVER'S PERFORMANCE TEST (ROAD TEST) INSTRUCTIONS

1. GENERAL

a. The driver's performance test determines whether an individual is proficient in operating a motor vehicle properly and safely under conditions of traffic and terrain where he is expected to drive. It serves as a basis for issuing an operator's permit. Furthermore, the test provides a means for instructional reinforcement and counseling. Driving weaknesses that may show up as the result of the test can be called to the examinee's attention and specific steps can be taken to eliminate them.

b. Final evaluations are recorded on DA Form 348 or on an equivalent official form.

c. The examiner will be a thoroughly qualified operator of the equipment transporter. He will be familiar with the road test route and the testing procedures. Before administering the test to any examinees, he must practice administering the test to a regular licensed driver qualified on that type of vehicle. This practice administration will help him become acquainted with the test route and testing procedures.

2. TESTING METHOD

a. 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 instructions which are indented and printed in large type are read or spoken aloud to the examinees. When giving instructions aloud, give the instructions slowly and distinctly, making sure the examinees understand. The directions in regular type, including those in parentheses, are for the information of the examiner only and are not given aloud.

3. DIRECTIONS FOR ADMINISTERING THE ROAD TEST

a. Setting Standards. The standard road test is five miles long with traffic and terrain representative of those areas in which the examinee is expected to drive. Approximately two miles of this route is in a more congested traffic area. Approximately one mile of the test route will be devoted to secondary road driving. Once a route is established (in a given locality), it should be used for all examinees who are to be tested. 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 will meet the following requirements (to the extent possible):

(1) Five right turns.

(2) Five left turns.

- (3) Two intersections.
- (4) Two traffic lights or stop signs.
- (5) Two slow zones.
- (6) One railroad crossing.
- (7) Two steep upgrades.
- (8) Two steep downgrades.
- (9) One backing area of 50 feet with a clearly marked line extending the whole length of the 50 feet.

b. Giving Road Test. The road test consists of a series of operations which the examinee must perform. These operations are listed on the Driver's Road Test Checklist which must be used in administering this test. Typical operations are starting the motor, pulling out, and parking.

c. Giving Instructions. Give instructions to perform an operation well in advance of that operation to allow the driver sufficient time to conform. In giving instructions, first tell the examinee where to perform the operation and then tell him what to do. For example, "At the corner two blocks from here, turn right." Notice that the location was given in terms of landmarks. This must always be done.

CAUTION

The driver must never be urged to do something which is unsafe or which he does not want to do. Such urging may lead to an accident.

d. Preventing Accidents

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

(2) You must be prepared to take control of the vehicle at a moment's notice. You must always watch traffic conditions and warn the examinee of dangers which you think he does not see. If the driver becomes involved in a dangerous or unlawful moving traffic incident or an accident, the test is to be terminated immediately and the examiner will drive the vehicle back to the start point (once on-scene responsibilities are fulfilled).

e. Beginning the Road Test.

(1) On the Driver's Road Test Checklist, enter the date in the appropriate place. Then say to the examinee--

WHAT IS YOUR NAME, LAST NAME FIRST, SPELL IT?

(2) Fill in the examinee's name after the word NAME, then say--

WHAT IS YOUR RANK?

(3) Enter the individual's RANK after the word RANK, then say--

WHAT IS YOUR ORGANIZATION?

(4) Enter the name of the organization after the word ORGANIZATION. Enter your name after the word EXAMINER (last name first). After the word VEHICLE, enter the model of vehicle used in the road test. Then say to the examinee--

THERE WILL BE NO "TRICK" ORDERS.

YOU WILL NOT BE ASKED TO DO ANYTHING IN VIOLATION VOF THE LAW OR OF GOOD DRIVING PRACTICES.

(YOUR SCORED TEST BEGINS WITH BEFORE-OPERATIONS PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS). (The examiner may stop the PMCS process when he is sure the examinee is knowledgeable in the PMCS procedures.)

FOLLOW MY INSTRUCTIONS. DRIVE PROPERLY AND SAFELY.

ARE THERE ANY QUESTIONS?

(5) Answer all questions, except those pertaining to the scoring procedures; then say--

DURING THE TEST, I WILL MAKE SOME OBSERVATIONS AND KEEP NOTES; DO NOT BE CONCERNED. YOUR SCORED ROAD TEST STARTS NOW. ALL RIGHT, START YOUR MOTOR.

(6) Directions for each operations, such as "next block, turn left," are to be given one at a time in their proper sequence, as set up by the test route according to paragraph 3a, above.

4. SCORING THE ROAD TEST

a. Within each of the operations which the examinee will be required to perform, there is a list of errors on the Driver's Road Test Checklist. Every time the examinee makes one of these errors under the specific operation, place a tally mark next to the error under that operation. For example, if the examinee fails to signal when leaving the curb, place a tally mark next to "fails to give proper signal" under the operation "Pulling Out," and nowhere else. The tally mark will be placed in the space to the left of the specific error. Since an individual will be required to repeat some of the operations, such as right turns, a number of times, more than one tally mark can be placed next to the same error under a given operation. Some test routes do not lend themselves to all operations indicated on the checklist. In these cases, score only the operations that apply.

b. At the completion of the test, count the number of tally marks and subtract this number from 100 to obtain the examinee's score. Record the score in the space provided on the checklist.

c. The lowest passing score is 70. If the examinee does not achieve 70 or above, the reason for failure will be indicated in the space provided under REMARKS; for example, "Examinee did not obtain minimum passing score" or "Examinee exhibited undue nervousness."

d. Automatic Failures

(1) Any unsafe driving act.

(2) Failure to properly perform PMCS.

(3) Not knowing location and function of gauges and controls.

(4) Undue nervousness.

(5) Failure to achieve minimum passing score.

(6) If an individual scores 70 or higher on the road test and, in the opinion/judgment of the test examiner the examinee needs additional training, he has the right not to issue a license.

5. After-Action Review (AAR). Weakness exhibited by the examinee in the test will be brought to his attention, and he will be advised in what areas he needs further practice or training. The counseling will be accomplished whether the examinee passes or fails the road test. After the examinee has received additional training, he will be retested. An examinee who fails the road test must retake the entire road test.

INTERMEDIATE TRAINING OBJECTIVE 2

DRIVER'S ROAD TEST CHECKLIST

NAME _____ RANK _____ DATE _____ VEHICLE _____
ORGANIZATION _____ EXAMINER _____

BEFORE STARTING ENGINE

FAILS TO --

- _____ Ensure vehicle is properly dispatched
- _____ Sign DD Form 1970 and/or other forms as required.
- _____ Perform before-operations maintenance checks and services (PMCS) using appropriate -10 manual.
- _____ Unchock wheels and stow chock blocks (as required).
- _____ Adjust all mirrors.
- _____ Adjust seat.
- _____ Fasten seat belt/safety restraint.

STARTING ENGINE

FAILS TO --

- _____ Ensure proper gear selection, such as neutral.
- _____ Warm engine properly.
- _____ Check to ensure all gauges are functioning properly.
- _____ Ensure there is adequate air pressure (as required).

PULLING OUT

FAILS TO --

- _____ Select proper gear.
- _____ Release parking brakes.
- _____ Look back and check traffic (use mirrors and windows).
- _____ Give proper signal.
- _____ Allow traffic to pass.
- _____ Make a smooth start.
- _____ Check all gauges periodically.
- _____ Maintain adequate air pressure (as required).
- _____ Check mirrors periodically.
- _____ Keep both hands on steering wheel (except as required by driving needs).
- _____ Engage inhibitor override.

DRIVING IN TRAFFIC (SPEED)

FAILS TO --

- _____ Stay within the speed limits.
- _____ Reduce speed when required by road conditions.
- _____ Maintain adequate speed (drives too slow).
- _____ Maintain constant speed as much as possible (feeds gas erratically).
- _____ Maintain proper speed for gear selection.
- _____ Reduce speed when required by traffic conditions.
- _____ Check all gauges periodically.
- _____ Maintain adequate air pressure (as required).
- _____ Check mirrors periodically.
- _____ Keep both hands on steering wheel (except as required by driving needs).

DRIVING IN TRAFFIC (ATTENTION, ATTITUDE)

FAILS TO --

- _____ Stay in proper lane.
- _____ Maintain proper following distance from vehicle ahead in traffic (twice the speedometer reading in feet).
- _____ Maintain proper following distance at high speeds (40 mph or over) from vehicle ahead on open highways (two times the speedometer reading in yards).
- _____ Anticipate action of other drivers and pedestrians.
- _____ Observe and obey signs, signals, and/or police officers.
- _____ Give necessary warning (sound horn).
- _____ Yield right-of-way to other vehicles.
- _____ Yield right-of-way to pedestrians.
- _____ Be courteous toward other drivers.
- _____ Slow down when approaching railroad grade crossings.
- _____ Stop, look, and listen both ways before entering railroad grade crossings.
- _____ Prevent creeping or drifting when stopped.
- _____ Perform during-operations maintenance.
- _____ Check all gauges periodically.
- _____ Check mirrors periodically.
- _____ Maintain adequate air pressure (as required).
- _____ Keep both hands on steering wheel (except as required by driving needs).

LEFT TURN

FAILS TO --

- _____ Give proper signal in advance.
- _____ Turn from proper lane (usually adjacent to centerline).
- _____ Turn into proper lane (usually immediately to the right of the centerline).
- _____ Avoid cutting corners.
- _____ Maintain safe speed.
- _____ Straighten out properly.

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- _____ Check mirrors periodically.
- _____ Maintain adequate air pressure (as required).
- _____ Keep both hands on steering wheel (except as required by driving needs).

RIGHT TURN

FAILS TO --

- _____ Give proper signal in advance.
- _____ Turn from proper lane (usually the right lane).
- _____ Turn into proper lane (usually the right lane).
- _____ Avoid swinging too wide.
- _____ Maintain safe speed.
- _____ Avoid cutting corners.
- _____ Straighten out properly.
- _____ Check mirrors periodically.
- _____ Maintain adequate air pressure (as required).
- _____ Keep both hands on steering wheel (except as required by driving needs).

USE OF CONTROLS

FAILS TO --

- _____ Use proper shifting patterns (upshifting and downshifting).
- _____ Avoid racing engine.
- _____ Start on hill without rolling back.
- _____ Keep both hands on steering wheel (except as required by driving needs).
- _____ Check all gauges periodically.
- _____ Maintain engine speed of not less than 1500 rpm (city) and 1800 to 1900 rpm (highway).
- _____ Disengage the inhibitor override while vehicle is in motion.

SLOWING OR STOPPING

FAILS TO --

- _____ Signal intent in advance.
- _____ Check mirrors and windows.
- _____ Brake smoothly.
- _____ Use engine as a brake by downshifting the transmission.
- _____ Use engine retarder (Jacobs brake)
- _____ Use brakes in proper sequence (engine and wheel).
- _____ Observe traffic to the rear (use mirrors and windows).
- _____ Maintain adequate air pressure (as required).
- _____ Keep both hands on steering wheel (except as required by driving needs).

OVERTAKING AND PASSING

FAILS TO --

- _____ Check for other traffic (use mirrors and windows).
- _____ Signal in advance.

- _____ Maintain proper following distance before passing.
- _____ Pass in proper lane.
- _____ Change lane gradually in passing.
- _____ Return to proper lane only after signaling intent and ensuring that lane is clear.
- _____ Obey "no passing" signs, rules, or regulations (such as hills, curves, and intersections).
- _____ Check mirrors periodically.
- _____ Maintain adequate air pressure (as required).
- _____ Check all gauges periodically.
- _____ Keep both hands on steering wheel (except as required by driving needs).

BACKING

FAILS TO --

- _____ Look behind vehicle before backing.
- _____ Ensure backup alarm override switch is in the "Normal" position unless in a quiet zone.
- _____ Sound horn.
- _____ Back slowly.
- _____ Back smoothly.
- _____ Back in a straight line using mirrors and ground guide (50 feet within six inches of line laterally).
- _____ Maintain adequate air pressure (as required).
- _____ Keep both hands on steering wheel (except as required by driving needs).

PARKING

FAILS TO --

- _____ Check for other traffic.
- _____ Give proper signal for traffic to pass.
- _____ Park within two attempts.
- _____ Park without bumping or scraping curb.
- _____ Park in space three feet wider than test vehicle (angle parking).
- _____ Set parking brakes.
- _____ Chock wheels.
- _____ Maintain adequate air pressure (as required).
- _____ Perform after-operation PMCS.
- _____ Keep both hands on steering wheel (except as required by driving needs).

ROAD TEST SCORE

100

NUMBER OF TALLY MARKS (SUBTRACT)

ROAD TEST SCORE

REMARKS:

**INTERMEDIATE TRAINING OBJECTIVE 3
CHECKLIST FOR LOADING A SEMITRAILER**

NAME _____ RANK _____ DATE _____ VEHICLE _____

ORGANIZATION _____ EXAMINER _____

PERFORMANCE STEPS	GO	NO-GO
1. Preparation of the M916 tractor by the operator and crew.		
a. Apply parking brakes.		
b. Move transmission to neutral.		
c. Place one chock block in front of rear dual tires and one chock block in rear of rear dual tires.		
2. Preparation of M172A1 semitrailer by the operator and crew.		
a. Chock wheels.		
b. Disconnect and remove lashing chains and load binders from loading ramps and wheel covers		
c. Pick up and carry the two loading ramps by the handles into position at the rear of semitrailer.		
d. Install and secures loading ramps onto loading ramp clips.		
e. Adjust ramps to proper width.		
f. Place four wheel covers over the four wheel openings.		
g. Remove all BII from the stowage compartment.		
h. Drive scoop loader slowly up the ramps.		
i. Move scoop loader forward until the front tires are slightly past the center of the second tie-down ring.		
j. Place chock blocks in front of the front tires and to the rear of the rear tires.		
k. Nail chock blocks in place.		
l. Attach one shackle to each of the front tie-down and lifting provision.		
m. Attach one chain to the shackle on the left front tie-down provision and to the right front trailer tie-down ring.		
n. Attach one chain to the shackle on the right front tie-down provision and to the left front trailer tie-down ring.		

PERFORMANCE STEPS

GO NO-GO

o. Attach one chain to the shackle on the left front lifting provision and to the left trailer gooseneck tie-down ring.		
p. Attach one chain to the shackle on the right front lifting provision and to the right trailer gooseneck tie-down ring.		
q. Attach one chain to the left rear tie-down provision and to the right rear trailer tie-down ring.		
r. Attach one chain to the right rear tie-down provision and to the left rear trailer tie-down ring.		
s. Attach one chain to the left rear tie-down provision and to the left side trailer tie-down ring.		
t. Attach one chain to the right rear tie-down provision and to the right side trailer tie-down ring.		
u. Attach one load binder to each chain and tighten.		
3. Preparation of the M920 tractor and M870 semitrailer by the operator and crew.		
a. Connect the winch cable to the gooseneck.		
b. Remove lock pins.		
c. Lower gooseneck to the ground.		
d. Operator takes up winch cable.		
e. Operator stops winching.		
f. Crew member bolts cable to anchor.		
g. Operator disengages winch controls.		
h. Operator follows normal shutdown procedures.		
i. Driver moves tractor out of loading area.		
j. Drive the D8K slowly up the front ramp toward the rear of the semitrailer until the blade will rest on the slanted rear ramp.		
k. Position the D8K so that the center of the fourth roller is located 122 inches from the intersection of the gooseneck and the trailer deck.		
l. Set parking brake on the D8K.		

PERFORMANCE STEPS	GO	NO-GO
m. Using the winch, raise and secure the gooseneck in the travel position.		
n. Couple semitrailer to tractor.		
o. Lower the ripper shank from the extreme up position until it makes contact with the trailer gooseneck.		
p. Make sure there is contact between the outrigger plank and the D8K tractor tracks.		
q. Attach clevis to 1st tie-down ring on the semitrailer.		
r. Attach upper rear track carrier roller support assembly to the 2d tie-down ring.		
s. Attach upper rear carrier roller support assembly down behind the push beam to the 3d tie-down ring.		
t. Attach forward carrier roller support assembly down behind the push beam to the 4th tie-down ring.		
u. Attach front tow track to the 5th tie-down ring.		
v. Repeat these tie-down procedures on the opposite side of the semitrailer.		
w. Attach two tie-down chains to the ripper shanks crisscross and attach to the tie-down rings on the semitrailer gooseneck.		
4. Preparing the semitrailer for travel.		
a. Check that all payload chains are tight.		
b. Check that all BII are stowed properly on the semitrailer.		
c. Use towed vehicle controls and check the semitrailer brakes and lights.		
d. Check tire pressure on semitrailer tires.		

**INTERMEDIATE TRAINING OBJECTIVE 3
CHECKLIST FOR UNLOADING A SEMITRAILER**

NAME _____ **RANK** _____ **DATE** _____ **VEHICLE** _____
ORGANIZATION _____ **EXAMINER** _____

PERFORMANCE STEPS	GO	NO-GO
1. Preparation of the M916 tractor by the operator and crew.		
a. Apply parking brakes.		
b. Move the transmission to neutral.		
c. Place one chock block in front of rear dual tires and one chock block in rear of rear dual tires.		
2. Preparation of M172A1 semitrailer by the operator and crew.		
a. Chock wheels.		
b. Disconnect and remove lashing chains and load binders from loading ramps.		
c. Pick up and carry the two loading ramps by the handles into position at the rear of semitrailer.		
d. Install and secures loading ramps onto loading ramp clips.		
e. Adjust ramps to proper width.		
f. Remove chock blocks from the front and rear tires of the scoop loader.		
g. Release and remove all tie-down chains.		
h. Scoop loader operator slowly backs the scoop loader off the semitrailer and down the ramps.		
3. Preparation of M916 tractor and M172A1 semitrailer for travel.		
a. Install loading ramps and wheel covers in the stowed position.		
b. Secure loading ramps and wheel covers with lashing chains and binders.		
c. Check that all BII is properly stowed.		
d. Use the towing vehicle controls and check that the semitrailer brakes and lights are operating.		
e. Remove the chock blocks from the semitrailer wheels.		

GLOSSARY

AAR	after-action review
BII	basic issue items
C	Celsius
C-HET	commercial heavy-equipment transporter
EOCCT	end of course comprehensive test
F	Fahrenheit, false
GCWR	gross combined weight rating
km/h	kilometers in the hour
kPa	kilopascals
LET	light-equipment transporter
LO	lubrication order
LPS	lamps
MCP	maintenance collection point
MET	medium-equipment transporter
MSR	main supply route
NMC	not mission capable
PA	public address
PMCS	preventive maintenance checks and services
PTO	power take-off
psi	pounds per square inch
rpm	revolution per minute
SOP	standing operating procedure
TC	training circular
TM	technical manual
TVT	television videotape
vdc	volts direct current

REFERENCES

SOURCES USED

These are the sources quoted or paraphrased in this publication.

AR 385-30. Safety Color Code Markings and Signs. 15 September 1983.

TB 43-PS-446 (PS Magazine), Issue 353, April 1982.

TB 43-PS-446 (PS Magazine), Issue 446, January 1990.

DOCUMENTS NEEDED

These documents must be available to the intended users of this publication.

*DA Form 2404. *Equipment Inspection and Maintenance Worksheet*. 1 April 1979

*DA Pamphlet 738-750. Functional Users Manual for the Army Maintenance Management System (TAMMS). 31 October 1989.

*DD Form 1970. Motor Equipment Utilization Record. April 1981.

*FM 21-60. *Visual Signals*. 30 September 1987.

*FM 21-305. *Manual for the Wheeled Vehicle Driver*. 24 September 1984.

*FM 55-30. Army Motor Transport Units and Operations. 14 March 1980.

*FM 55-312. Military Convoy Operations In the Continental United States. 10 August 1981.

*LO 9-2320-270-12. Truck Tractor, Commercial Heavy Equipment Transporter (C-HET), 85,000 GVWR, 8X6, M911 (NSN 2320-01-025-3733). 26 October 1990.

*LO 9-2320-273-12. Truck Tractor, Line Haul, 50,000 GVWR, 6X4, M915 (NSN 2320-01-028-4395); Truck Tractor, Light Equipment Transporter (LET), 56,000 GVWR, 6X6, w/Winch, M916 (NSN 2320-01-028-4396); Truck Tractor, Medium Equipment Transporter (MET), 75,000 GVWR, 8X6, w/Winch, M920 (NSN 2320-01-028-4397).... 14 January 1983.

*TM 5-2330-360-14P. Operator's, Organizational, Direct Support, and General Support Maintenance Including Repair Parts and Special Tools Lists for Semitrailer, Lowbed: 40-Ton Construction Equipment Transporter M870 (CCE) (CMI/Load King Model 403LF) (NSN 2330-00-133-1731). 6 December 1984.

*This source was also used to develop this publication.

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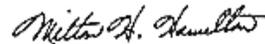
- *TM 9-2320-270-10. Operator's Manual for Truck, Tractor, Commercial, Heavy Equipment Transporter (C-HET), 85,000 GVWR, 8X6, M911 (NSN 2320-01-025-3733). 2 December 1983.
- *TM 9-2320-273-10. Truck Tractor, Line Haul, 50,000 GVWR, 6X4, M915 (NSN 2320-01-028-4395); Light Equipment Transporter (LET), 56,000 GVWR, 6X6, w/Winch, M916 (NSN 2320-01-028-4396); Medium Equipment Transporter (MET), 75,000 GVWR, 8X6, w/Winch, M920 (NSN 2320-01-028-4397).... 15 May 1980.
- *TM 9-2330-211-14P. Operator's, Organizational, Direct Support, and General Support Maintenance Including Repair Parts and Special Tools List for Semitrailer, Lowbed: 15-Ton, 4-Wheel, M172 (NSN 2330-00-735-9326) and 25-Ton, 4-Wheel, M172A1 (NSN 2330-00-317-6448). 5 September 1984.
- *TM 55-2350-255-14. Transportability Guidance; Tank, Combat, Full-Track, 105-mm Gun, M1, and 120-mm Gun, M1E1. 18 April 1984.
- *TM 55-2410-234-14. Highway Transport Procedures: Transport of Caterpillar Model D8K-8S-8, Tractor with Ripper or Winch on M870, 40-Ton, Lowbed Trailer Using the M920 Truck. 10 August 1984.
- *TM 55-3805-262-14. Transportability Guidance for Scoop Loader, Wheeled: MW24C, 2 1/2-Cubic-Yard-Capacity Commercial Construction Equipment (NSN 3805-01-150-4814). 11 April 1986.

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