MEDIUM TACTICAL VEHICLE REPLACEMENT (MTVR) OPERATORS COURSE

A-730-0045A

TRAINEE GUIDE

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Center for Seabees and Facilities Engineering

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## CHANGE RECORD

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</tbody>
</table>
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>SECTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHANGE RECORD</td>
<td>3</td>
</tr>
<tr>
<td>SECURITY AWARENESS NOTICE</td>
<td>7</td>
</tr>
<tr>
<td>SAFETY/HAZARD AWARENESS NOTICE</td>
<td>9</td>
</tr>
<tr>
<td>SAFETY PRE-MISHAP PLAN</td>
<td>11</td>
</tr>
<tr>
<td>HOW TO USE YOUR TRAINEE GUIDE</td>
<td>15</td>
</tr>
<tr>
<td>TERMINAL OBJECTIVES</td>
<td>17</td>
</tr>
<tr>
<td>Lesson Topic 0.1: Orientation / Indoctrination</td>
<td>0.1 page 1</td>
</tr>
<tr>
<td>Lesson Topic 0.2: Safety Practices</td>
<td>0.2 page 1</td>
</tr>
<tr>
<td>Lesson Topic 0.3: Course Critique &amp; Graduation</td>
<td>0.3 page 1</td>
</tr>
<tr>
<td>UNIT 1 – PREFORM MTVR OPERATIONS</td>
<td></td>
</tr>
<tr>
<td>Lesson Topic 1.1: Introduction to the MTVR</td>
<td>1.1 page 1</td>
</tr>
<tr>
<td>Lesson Topic 1.2: MTVR Systems</td>
<td>1.2 page 1</td>
</tr>
<tr>
<td>Lesson Topic 1.3: Cab Controls</td>
<td>1.3 page 1</td>
</tr>
<tr>
<td>Lesson Topic 1.4: Collateral Equipment</td>
<td>1.4 page 1</td>
</tr>
<tr>
<td>Job Sheet 1.4-1: MTVR Collateral Equipment Stowage</td>
<td>1.4 page 11</td>
</tr>
<tr>
<td>Lesson Topic 1.5: First Echelon Maintenance</td>
<td>1.5 page 1</td>
</tr>
<tr>
<td>Job Sheet 1.5-1: First Echelon Maintenance (Prestart Checklist)</td>
<td>1.5 page 9</td>
</tr>
<tr>
<td>Information Sheet 1.5-2: First Echelon Maintenance (Servicing)</td>
<td>1.5 page 15</td>
</tr>
<tr>
<td>Lesson Topic 1.6: CTIS/ABS Operations</td>
<td>1.6 page 1</td>
</tr>
<tr>
<td>Assignment Sheet 1.6-1: CTIS &amp; ABS Operations</td>
<td>1.6 page 19</td>
</tr>
<tr>
<td>Lesson Topic 1.7: Vehicle Operations</td>
<td>1.7 page 1</td>
</tr>
<tr>
<td>Assignment Sheet 1.7-1: MTVR Operations</td>
<td>1.7 page 19</td>
</tr>
</tbody>
</table>
Job Sheet 1.7-2: MTVR Highway Operations ................................................................. 1.7 page 23
Job Sheet 1.7-3: MTVR Off Road Operations ............................................................... 1.7 page 29

UNIT 2 – OPERATE ANCILLARY EQUIPMENT

Lesson Topic 2.1: Self-Recovery Winch ................................................................. 2.1 page 1
Assignment Sheet 2.1-1: Self-Winch Operations ..................................................... 2.1 page 15
Job Sheet 2.1-2: Self-Winch Operations ................................................................. 2.1 page 17
Job Sheet 2.1-3: Dump Truck Operations ................................................................. 2.1 page 21

UNIT 3 - TRANSPORTABILITY

Lesson Topic 3.1: Load Capabilities ................................................................. 3.1 page 1
Lesson Topic 3.2: Preparation for Embark ............................................................. 3.2 page 1
Job Sheet 3.2-1: Preparation for Embark ................................................................. 3.2 page 9
SECURITY AWARENESS NOTICE

This course does not contain any classified material
SAFETY/HAZARD AWARENESS NOTICE

This notice promulgates safety precautions to the staff and trainees of the Naval Construction Training Center in accordance with responsibilities assigned by the Chief of Naval Education and Training through the Chief of Naval Technical Training.

TRAINING TIME OUT POLICY (TTO)

ALL STUDENTS MUST BE BRIEFED ON "TRAINING TIME OUT" POLICY BEFORE TRAINING COMMENCES. POLICIES ARE RELATIVE TO TRAINING SAFETY WHERE POTENTIAL FOR PERSONAL RISK EXISTS, NOT APTITUDE OR ATTITUDE.

TRAINING TIME OUT

1. A TTO may be called in any training situation whenever a student or instructor expresses concern for personal safety or a need for clarification of procedures or requirements exists. TTO is also an appropriate means for a student to obtain relief if he/she is experiencing pain, heat stress, or other serious physical discomfort.

2. At the start of training all students in high-risk training shall be briefed on TTO procedures. Prior to commencement of high-risk training situations, TTO procedures shall be re-briefed with emphasis on evolution specific, verbal and nonverbal signals to be used by students and instructors.

3. Instructors are responsible for maintaining situational awareness and shall remain alert to signs of student panic, fear, extreme exhaustion, or lack of confidence that may impair safe completion of the training exercise. Instructors shall immediately cease training when they consider such action appropriate.

4. Following a TTO the training situation shall be examined and additional explanation and instruction will be provided as necessary to allow safe resumption of training.

5. If a student refuses to participate in training after instruction has been provided, or when excessive use of TTO occurs, the student shall be removed from training and referred to an appropriate counseling authority for further assistance or administrative processing including removal of the student from training if warranted.
SAFETY PRE-MISHAP PLAN

The safety precautions contained in this course are applicable to all personnel. They are basic and general in nature. Personnel who operate and maintain equipment in support of U.S. Naval Construction Force must be thoroughly familiar with all aspects of personnel safety, and strictly adhere to every general as well as specific safety precautions contained in operating and emergency procedures and applicable governing directives.

Special emphasis must be placed on strict compliance of published safety precautions and on personal awareness of potentially hazardous conditions peculiar to equipment maintenance.

Instructors shall be constantly alert to any unusual behavior, which may indicate a student is experiencing difficulty. Any time a student demonstrates signs of panic, fear, extreme fatigue or lack of confidence, immediately take appropriate action to ensure the student's safety.

All personnel must have a comprehensive knowledge of emergency procedures, which prescribe courses of action to be followed in the event of equipment failure, or human error as stated in the Pre-Mishap Plan. Strict adherence to approved and verified operating, emergency, and maintenance procedures is MANDATORY. As a minimum, each individual is responsible for knowing, understanding, and observing all safety precautions applicable to the command, school, course, their work, and their work areas. In addition, you are responsible for observing the following general safety precautions:

a. Each individual shall report for work rested and emotionally prepared for the tasks at hand.

b. Use normal prudence in all your functions, commensurate with the work at hand.

c. Report any unsafe conditions, or any equipment or material which you consider to be unsafe, and any unusual or developing hazards.

d. Warn others whom you believe to be endangered by known hazards or by failure to observe safety precautions, and of any unusual or developing hazards.

e. Report to the school staff any mishap, injury, or evidence of impaired health occurring in the course of your work or during non-training environment.

f. Wear or use the protective clothing and/or equipment of the type required, approved, and supplied for the safe performance of your work.

g. All personnel in the immediate vicinity of a designated noise hazardous area or noise hazardous operation shall wear appropriate hearing protective devices.
When a mishap occurs speed is essential, knowing the proper response for assistance will aid you in obtaining help. This pre-mishap plan provides pertinent information to assist you in the event of a mishap.

TERMS AND DEFINITIONS

MISHAP: Any unplanned or unexpected event causing personnel injury, occupational illness, death, material loss or damage, or an explosion of any kind whether damage occurs or not.

NEAR MISSES: Any near miss involving an industrial work process where activities avoid a fatality or catastrophic loss merely by chance; i.e. someone says “Boy, we’re lucky we didn’t kill somebody.” Activities should report other “near miss” incidents by informal correspondence or by SAFETYGRAM (OPNAV 5102/) shown in appendix 14-B. They may use either of these methods to describe any situation having mishap potential or as a vehicle to make recommendations to improve safety or occupational health. To provide anonymity, personnel may submit SAFETYGRAMs directly to COMNAVSAFECEN without normal chain of command routing. COMNAVSAFECEN requires the name of the activity, but not the name of the person originating the correspondence. Each course instructor will give examples of specific appropriate situations for their course.

UNSAFE CONDITIONS: A condition might exist which, if allowed to go unchecked has the potential to cause a mishap; or an act or event might result in a near mishap in which injury or damage was avoided merely by chance.

EMERGENCY PHONE NUMBERS: The numbers below are also posted in each classroom and practical training area. Know the location, building number, and room number and/or the closest building number to assist emergency responders in finding the injured member(s). Ensure you know the location of the nearest phone, if carrying a cellular phone; ensure there is reception in the area you are working. Consider adding emergency numbers to your cell phone; instructors shall have these numbers programmed into the duty phone.

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<td>Base Security</td>
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CHAIN OF COMMAND:

In the event of a mishap notify the following persons as soon as practical:

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<td>Training Officer</td>
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<td>Commanding Officer</td>
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REQUIRED INFORMATION:

Be prepared during the initial report to present the following information on injured personnel:

NAME AND RATE

TYPE OF INJURY - BRIEF AND TO THE POINT

TIME OF MISHAP

WHERE THE MISHAP OCCURRED

WHAT TYPE OF ACTIVITY THE VICTIM WAS ENGAGED IN

More detailed information will be required to submit a mishap report to higher authority at a later date. So it is advisable to write down all the pertinent facts as soon as possible while the events are still fresh in your mind.

EMERGENCY EQUIPMENT:

As the instructor responsible for the safety and well being of your students, it is imperative you know the location, condition and proper use of all emergency equipment required to protect your students.

Ensure the proper safety gear is available for the type of training being performed, if not, suspend training until available.

Know the location of emergency electrical disconnect switches for all electrically operated machines

Know the location of fire extinguishers and other fire fighting equipment

Know the fire evacuation routes and mustering areas for your students

Know the location, condition and proper use of safety protective gear

Know the location of the nearest telephone or cellular phone

In the event of personnel injury or fire assign personnel at strategic points to direct emergency vehicles, equipment, and crews to the location
HOW TO USE YOUR TRAINEE GUIDE

This publication has been prepared for your use while under instruction. It is arranged in accordance with the topics taught, and is in sequence with those topics. By using the table of contents you should be able to locate the lesson topics easily. By following the enclosed course schedule, you should be able to follow the course instruction in a logical manner.

The Objectives listed in this Guide specify the knowledge and/or skills that you will learn during the course, and reflect the performance expected of you on the job. The Enabling Objectives specify the knowledge and/or skills you will learn in a specific lesson topic. You should thoroughly understand the Enabling Objectives for a lesson topic and what these objectives mean to you before you start each lesson topic. Each learning objective contains behavior(s), conditions, and standards. They are defined as follows:

The behavior is a description of the performance and/or knowledge that you will learn in that lesson topic;

The condition under which you will be able to perform or use the knowledge;

The standard(s) to which you will be able to perform or use the knowledge.

The objectives provide a means by which you can check your progress during training. The objectives also enable you to evaluate your training when you have finished, so you can ensure that you have satisfied the goals of the course. Your instructor will explain the objectives to you at the start of the course. Feel free to ask for additional information during training if you feel that you are not learning as you should.

STUDY TECHNIQUES:

Classroom and laboratory sessions will be conducted by one or more instructors. You will be responsible for completing the material in this guide, some of it before class time. Prior to starting to use this guide, read through the front matter and become familiar with the organization of the material, then follow directions below for each lesson topic:

1. READ the Enabling Objectives for the lesson topic and familiarize yourself with what will be expected of you.

2. STUDY each reading assignment.

3. Write any written assignment.
EXAMINATIONS AND QUIZZES

Exams and quizzes will be administered as required by the Course Master Schedule. A quiz is an informal test used to check for understanding, and may be given by your instructor at any time. These quizzes do not count toward your final grade. In any event, only the material covered will be tested. All written tests will be in the form of multiple choice, completion, and or true/false items. Performance tests will be provided to test job skills as appropriate. Successes on exams are dependent upon an understanding of the objectives, involvement in class activities, and good study habits.
TERMINAL OBJECTIVES

1.0 OPERATE the MTVR in accordance with the USMC Technical Manual TM 10629-10A. Adhere to all safety procedures as prescribed by OPNAVINST 5100.19 (series)

2.0 OPERATE ancillary equipment in accordance with the USMC Technical Manual TM 10629-10A

3.0 PREPARE the MTVR for embarkation in accordance with the USMC Technical Manual TM 10629-10A
A. Introduction

During this lesson you will learn key points of organization, mission, and regulations of Naval Construction Training Center.

B. Enabling Objectives

0.1 Course familiarization topic.

C. Topic Outline

1. Introduction

2. Student supplies/materials
   a. Desk nameplate
   b. Trainee Guide
   c. Pencils and pen
   d. Notebook, loose leaf

3. Chain of Command and Organization
   a. Chain of Command
   b. Classroom Organization

4. Curriculum
   a. Learning Objectives, state what you must:
      (1) Know
      (2) Do
   b. Examinations
      (1) Criterion Referenced Tests, individual and team performance is compared to standards outlined in the objectives.
      (2) Written Test
      (3) Performance Test
c. Test/Subtopic Failure
   (1) Remediation
   (2) Academic Review Board (ARB)

d. Curriculum Counseling
   (1) Academic problems
   (2) Non-academic problems

e. Night Study
   (1) Mandatory
      (a) Failing grades
      (b) Poor academic performance
   (2) Voluntary
   (3) Reading assignments

f. Class hours
   (1) Monday through Friday ______ to ______.
   (2) Lunch ______ to ________
   (3) Absences
      (a) Medical
      (b) Dental
      (c) Leave
         (1) Regular
         (2) Emergency
      (d) Phone calls
         (1) Personal calls policy
(2) EO School

(3) NCTC OOD/Quarterdeck (emergency only)

(e) Tobacco Use Regulations
   (1) Only in designated areas.

(f) Appearance
   (1) Prescribed uniform
   (2) Neat, orderly appearance

(g) End of Course Critique
A. Introduction

During this lesson you will learn general safety practices, safe handling and use of equipment and tools, general shop safety, fire safety, MSDS, Pre Mishap Plan and Operational Risk Management (ORM).

B. Enabling Objectives

0.2 Course familiarization topic

C. Topic Outline

1. General Safety

   a. Generally, workers are injured because of their own carelessness or the carelessness of another person.

   b. Training for safety is just as important as learning to be a skilled craftsman. Safety is a combination; knowledge and awareness.

   c. To prevent mishaps and injuries, observe all safety regulations, use all safety devices and guards when working with machines, and learn to control your work and actions so as to avoid danger.

   d. **Everyone is responsible for safety.**

2. Safe handling and use of equipment and tools

   a. Warnings

      (1) Tags and signs

         (a) Danger tag

            1) Red

            2) DO NOT operate equipment with a red tag.

         (b) Caution tag

            1) Yellow

            2) Provides temporary operating instructions

            3) Operate with caution when attached.
(c) Warning sign
   1) White background with red and black lettering.
   2) Warn personnel of potential hazard, such as high voltage.

(d) Noise sign
   1) Warn personnel of high noise level that can be detrimental to hearing.
   2) Posted on equipment and/or door to room where the equipment is installed.

(2) Operation of fuel-driven machines
   (a) Safe practices
      1) Follow all operating instructions.
      2) Use the fuel specified on the fuel tank.

   (b) Unsafe practices
      1) Overloading the capacity of the equipment.
      2) Oiling or adjusting the equipment while it is in operation.
      3) Repairing equipment while it is operating.

(3) Operation of electric power-driven tools.
   (a) Plugging into electrical sources.
      1) Check for frayed or damaged cords.
      2) Turn switches OFF before plugging in.

   (b) Extension cord use:
      1) Ensure cord size and length is suitable for the amperage of the tool or equipment.
      2) Ground Fault Circuit Interrupter (GFCI)

   (c) Operation of pneumatic power tools
1) Wear protective gear:
   (a) Safety boots
   (b) Face shield or goggles.
   (c) Hearing protection

2) Lay idle tools down in such a manner that no harm can be done if the switch is accidentally activated.

3) DO NOT use compressed air improperly to:
   (a) Clean clothing being worn.
   (b) Blow dust off the body.

4) NEVER point an air hose at anyone.

b. General shop safety
   (1) Personal safety
      (a) Tripping hazards
         1) Ensure all hand tools and portable equipment are placed in a safe area.
         2) Ensure all extension cords lay on the floor or above head level.
      (b) Slipping hazards
         1) Keep all oil, grease and water wiped up.
         2) Place all paper in trashcans.
         3) Keep welding rod stubs off floor.
      (c) Eye hazards
         1) Use proper eye protection when hammering, chiseling and chipping to protect from small pieces of flying metal.
         2) DO NOT use tools with mushroomed heads.
         3) Use proper eye protection around cutting, grinding and welding operations.
(d) Compressed gases

1) Compressed gases can injure your eyes and penetrate the skin.

(e) Report all mishaps to class safety P.O. and/or instructor.

(2) Fire safety

(a) Avoiding and preventing fires.

1) Good housekeeping

   (a) Keep flammable materials away from heat and open flame.

   (b) Keep floors and work benches clean.

2) Proper storage of materials

   (a) Store oily rags in container.

3) Smoking

   (a) Smoke in authorized spaces only.

4) Know evacuation routes

   (a) From classroom.

   (b) From shop areas

5) Report all fires to class safety P.O. and/or instructor.

(3) Material Safety Data Sheet (MSDS)

(a) Purpose, used to identify hazardous materials and their properties:

1) What the material is

   (a) Name

   (b) Manufacture

   (c) Physical and chemical properties

   (d) Emergency information and phone numbers
LESSON TOPIC 0.2 - SAFETY PRACTICE

2) Why it’s hazardous
   (a) Physical risk/ways you can be exposed

3) How to work with it safely:
   (a) Protective equipment required
   (b) Proper handling and storage
   (c) Proper disposal

4) Check the MSDS before you start any job using hazardous materials and ensure that safety procedures are followed.

c. Pre Mishap Plan
   (1) Methods of reporting a mishap by telephone.
      (a) State whether an ambulance is needed and give the following information:
         1) Nature of mishap/accident
         2) Health hazards; signs and symptoms of exposure, such as headaches, nausea, dizziness, eye and skin irritations.
         3) Location
         4) Number of injured and seriousness
      (2) Speed is important, but relaying proper location and information can save a life.
      (3) It is important that a mishap/accident form be filled out as soon as possible.

3. Operational Risk Management (ORM) Concept
   a. A decision making tool used by people at all levels and events to increase operational effectiveness by anticipating hazards and reducing the potential for loss, thereby increasing the probably of a successful mission.
   b. Increases our ability to make informed decisions by providing the best baseline of knowledge and experience available.
   c. Minimizes risk to acceptable levels, commensurate with mission accomplishment. Applying the ORM process will reduce mishaps, lower cost, and provide for more efficient use of resources.
4. ORM Five Step Process
   a. Identify
   b. Assess hazards
   c. Make Risk Management Decisions
   d. Implement Controls
      (1) Administrative Controls
      (2) Engineering Controls
      (3) Personal Protective Equipment
   e. Supervise

5. Principals of ORM
   a. Accept risk when benefits outweigh the cost – the goal of ORM is not to eliminate risk, but to manage the risk so the mission can be accomplished with a minimum amount of loss.
   b. Accept no unnecessary risk – only take risks which are necessary to accomplish the mission.
   c. Anticipate and manage risk by planning – identify risk early in the planning process.
   d. Make risk decisions at the right level – management decisions are made by the leader directly responsible for the operation.

6. Risk Assessment Matrix
   a. Hazard Severity – assessment of the worst credible consequence which can occur as a result of a hazard.
      I = May cause death, loss of facility/asset
      II = May cause severe injury, illness, property damage
      II = May cause minor injury, illness, property damage
      IV = Minimal threat
b. Mishap Probability – the probably that a hazard will result in a mishap or loss.

A = Likely to occur immediately or within a short period of time
B = Probably will occur in time
C = May occur in time
D = Unlikely to occur

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b. Risk Assessment Code (RAC)

1 = Critical
2 = Serious
3 = Moderate
4 = Minor
5 = Negligible

7. CRM (Crew Resource Management)

a. Use CRM to increase mission effectiveness by enhancing crew coordination through increased awareness of the associated behavioral skills listed below.

1) CRM meetings should be held with or immediately after the ORM meeting.

2) Each crew team member shall:
   a) Have a basic knowledge of the equipment being used, its capabilities, limitations and safety precautions.
   b) Understand his/her responsibilities and the responsibilities of other members of the team.
   c) Participate in the ORM brief and understand its findings.
   d) Be familiar with the safety equipment and PPE in use.
   e) Know the location(s) of first aid kits and phone number(s) for the local emergency services.
3) The seven behavior skills of CRM are:

a) Memory Acronym - “DAMCLAS“

**Decision-making** – ability to use logical and sound judgment based on the information at hand.

**Assertiveness** – willingness to actively participate in tasks, and the ability to state and maintain your position, until convinced by facts that your position is wrong.

**Mission analysis** – ability to make short/long-term contingency plans, coordinate, allocate, and monitor crew resources. Ability to think ahead and avoid problems.

**Communication** – ability to clearly and accurately send and acknowledge information, instructions, or commands and provide useful feedback.

**Leadership** – ability to direct and coordinate the activities of other crewmembers and to encourage the crew to act as a team.

**Adaptability/Flexibility** – ability to alter a course of action to meet situational demands, to maintain constructive behavior under pressure, and to interact constructively with other crewmembers.

**Situational Awareness** – ability to recognize the degree of accuracy by which one’s perception of events mirrors reality.
A. Introduction

During this lesson you will be introduced to the course critique requirements and participating in graduation functions.

B. Enabling Objectives

0.3 Course familiarization topic

C. Topic Outline

1. Course Critique
   a. Each student will complete the required critique sheet
   b. Students are encouraged to make additional comments pertaining to course content, quality of instruction, and quality of life while at NCTC.

2. Graduation
   a. Place
   b. Time
   c. Dress
A. Introduction

During this lesson you will learn key points of operating the Medium Tactical Vehicle Replacement (MTVR).

B. Enabling Objectives

1.1 **DESCRIBE** the MTVR in accordance with USMC TM 10629.10A.

1.2 **DESCRIBE** the types of MTVR in accordance with USMC TM 10629.10A.

1.3 **DESCRIBE** the major components of the MTVR in accordance with USMC TM 10629.10A.

1.4 **DESCRIBE** the performance of the MTVR in accordance with USMC TM 10629.10A.

1.5 **DESCRIBE** MTVR abbreviations in accordance with USMC TM 10629.10A.

1.6 **DESCRIBE** the safety precautions for the MTVR in accordance with USMC TM 10629.10A.

1.7 **DESCRIBE** the capabilities of the MTVR in accordance with USMC TM 10629.10A.

C. Topic Outline

1. MTVR Description
   a. 7-Ton, 6x6 truck designed for use on all types of terrain.
      (1) Highway
      (2) Cross-Country
      (3) Mud, Sand, and Snow
   b. Operates in extreme conditions.
      (1) Arctic
      (2) Desert

2. Types of MTVRs currently in NCF.
   c. MK 27, Truck, Extra Long Wheel Base (XLWB), 7-Ton, without winch
d. MK 28, Truck, XLWB, 7-Ton, with winch

e. Variants

(1) MK 27, Truck, Extra Long Wheel Base (XLWB), 7-Ton (without winch)

(2) MK 28, Truck, XLWB, 7-Ton, (with winch)

(3) MK 30, Standard Wheel Base (SWB) Dump, 7-Ton, with winch

(4) MK 31, Truck, Tractor, 7-Ton (without winch)

(5) MTVR Wrecker (MK-36)
3. Major components (exterior) and location.
   a. Muffler
   b. Cab
   c. Engine Compartment
   d. Glad hands
   e. Air Cleaner
   f. Axles 2 and 3
g. Hydraulic Tank
   (1) Site Tube
h. Battery Box
   (1) Can hold up to four
i. Fuel Tank
   (1) Holds 80 gal / 76 useable
j. Tie downs
k. Pintle Hook
l. Gladhands front/rear
m. MK 28

(1) Winch

(2) Rear stowage cover

   (a) Troop Seats

   (b) Side Racks

(3) Under ride Bar

   (a) Highway

   (b) Off-Road
LESSON TOPIC 1.1 Introduction to MTVR

4. Performance
   a. Gradient
      (1) Longitudinal ___________________________________________________
      (2) Side slope ___________________________________________________
   b. Environmental
      (1) -50° F to 125° F (150° F storage)
      (2) -25 F to -50 F with kits
   c. Speed, Maximum
      (1) Gross Vehicle Weight (GVW) Road  65 mph
         (a) The vehicle is capable of traveling 65 mph. However, the operator must adhere to the speed limits set by Navy Directives and local SOP.
      (2) Tire Rating 55 mph
         (a) Michelin Approval Letter
   d. Fording -  60 inches max.
   e. Cruising Range  300 mi. CCGVW, road

5. Abbreviations and Terms
   a. Anti-lock braking system (ABS)
   b. Automatic Traction Control (ATC)
   c. Central Tire Inflation System (CTIS)
   d. Power Take Off (PTO)
   e. Total Information Module (TIM)
      (1) Used by CM’s
   f. Message Information Module (MIC)
(1) Used by CM’s

g. Electronic Control Module (ECM)

h. Basic Issue Items (BII)

i. Components of End Items (COEI)

6. Safety - Warnings & Cautions

a. **WARNINGS - possible injury to personnel.** The entire list of WARNINGS and Cautions can be found on pages xi through xxxvii of the USMC Training Manual (TM) 10629.10A. A few examples are listed below.

(1) **Air Drain Valves** may be under extreme pressure. Do not allow face to be in front of air drain valves while draining air reservoirs. Open air drain valves slowly to prevent sudden blast of air. Failure to comply may result in serious injury to personnel.

(2) The **Driver is responsible** for the safety of the personnel riding on their vehicle. Drivers will refuse to move a vehicle if anyone is in an unsafe position or the vehicle has too many passengers unless otherwise directed by your Unit Commander. Failure to comply may result in serious injury or death to personnel.

(3) Do not use **Steering Wheel** for a handgrip to enter the Truck cab. Using the Steering Wheel for handgrip may cause sudden violent jerking of vehicle. This may result in severe injury to operator.

(4) When **entering or exiting cab**, use three point contact system. Failure to comply may result in injury to personnel.

(5) **Do not back up without a Ground Guide.** Failure to comply may result in damage to vehicle, injury or death to personnel.

(6) **Do not ford water** unless depth is known. Water deeper then 60 inches may cause personal injury or damage to equipment.

b. **CAUTIONS**

(1) When using a Pressure Washer to clean vehicle, do not allow water stream to contact dash, keep nozzle at least a distance of five feet from dash components, or other electrical components. Failure to comply may result in damage to equipment.
(2) Do not fill Fuel tank above full level line on outside of tank or fuel spillage will occur.

(3) Before operating off-road, rear mud flaps need to be pinned on storage hooks located on mud flap brackets. If steep slope is encountered and rear mud flaps are not pinned, damage may result.

(4) Before operating off-road or up steep grades, ensure Under ride bar is adjusted to upper position to allow maximum road clearance. Failure to comply may result in damage to vehicle.

7. MTVR Capabilities
   
a. Dimensions MK 27 and MK 28

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>98 inches</td>
</tr>
<tr>
<td>Operational Height</td>
<td>141.2 inches</td>
</tr>
<tr>
<td>Transport Height</td>
<td>98 inches</td>
</tr>
<tr>
<td>Length</td>
<td>386.5 inches</td>
</tr>
<tr>
<td>Ground Clearance</td>
<td></td>
</tr>
<tr>
<td>Cross Country</td>
<td>16.2 inches</td>
</tr>
<tr>
<td>Highway</td>
<td>16.7 inches</td>
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</table>
b. Weights MK 27 and MK 28

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SPECIFICATION</th>
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</thead>
<tbody>
<tr>
<td>Vehicle Curb Weight (VCW)</td>
<td></td>
</tr>
<tr>
<td>MK27 (w/o winch)</td>
<td>30,067 pounds</td>
</tr>
<tr>
<td>MK28 (w/ winch)</td>
<td>31,955 pounds</td>
</tr>
<tr>
<td>Gross Vehicle Weight Rating (GVWR)</td>
<td></td>
</tr>
<tr>
<td>MK27 (w/o winch)</td>
<td>62,200 pounds</td>
</tr>
<tr>
<td>MK28 (w/ winch)</td>
<td>62,200 pounds</td>
</tr>
</tbody>
</table>

c. Cab

(1) Construction and Accessories

(a) Welded aluminum extrusion construction with adhesively bonded corrosion resistant skins

(b) Three-person 82.3 in. cab width.

(c) Hinged windshield, roof, side walls, door frames, and rear wall for reducible height to 98 in

(d) One-piece front windshield

(2) Instrumentation

(a) Modular dash panels

(b) Multiplex gauge control

(c) J1708 and J1939 data bus communications

(d) US/metric color band gauges
d. Cargo Body.

(1) Payload Capability
   (a) 10 and 15 tons ISO and non-ISO payload on primary and secondary roads
   (b) 7.1 tons ISO and non-ISO payload on all terrain

(2) ISO Compatible Payloads
   (a) 20 ft ISO container and shelter (1 ea)
   (b) 10 ft EMI/EMC shelters (2 ea)
   (c) Quad-cons (4 ea)
   (d) Six-cons (3 ea)
A. Introduction

During this lesson you will learn key points of the systems for the MTVR.

B. Enabling Objectives

1.8 **DESCRIBE** the systems of the MTVR in accordance with USMC Technical Manual 10629.10A

C. Topic Outline

1. MTVR Systems
   a. Air System
      (1) After Cooler
      (2) Air Dryer
      (3) Primary #1 and #2 reservoir
      (4) Supply Reservoir
      (5) Secondary Reservoir
b. Electrical System

(1) Alternator
   (a) 150 amps

(2) Voltage
   (a) 24 volts with 12 volt accessory provision in cab

(3) Battery
   (a) Two 12 volt (625 CCA ea. @ 18°F)
   (b) Battery box has provision for four batteries for 32°F to -50°F operation

c. Brake System

(1) Parking and Emergency Brakes
   (a) Parking - Spring brakes on axles 2 and 3 Modulate emergency system
   (b) Emergency - Spring brakes on axles 2 and 3 Modulate emergency system

(2) Service Brakes
   (a) Drum with internal shoe
   (b) Dual system air operated
   (c) Meritor RDA type-9 wedge
   (d) Size front 16.1 x 7.1 in. rear 16.5 x 7 in.
d. Engine

(1) Cat C-12 electronic control
   Adam III

(2) 4-Stroke, in-line, six
cylinder electronic.

(3) Bore 5.12 in.

(4) Stroke 5.91 in.

(5) Displacement 729 in$^3$

(6) Maximum Horsepower 425
   hp @ 1800 rpm

(7) Peak Torque 1,550 ft-lb @
    1200 rpm.

(8) Jacobs engine brake: Three settings High, Medium, and Low
e. Cooling System

(1) Type

(a) Cross flow fin and tube type radiator with 32”, 9 bladed plastic fan.

(2) Frontal Area 1,241 in²

(3) Construction fabricated end tanks and side members bolted together to form rigid frame surrounding radiator core

(a) Built in de-aeration system

(4) Fan 32in. nine blade, serpentine belt driven

(5) Fan Clutch- Temperature Controlled

(6) Diagram of fluid flow through cooling system
f. Transmission:

(1) Make and model

   (a) Allison HD4070P, Automatic electronic control, WTEC III

(2) Type

   (a) Seven speed automatic with TC-541 torque converter second gear start

(3) Ratios

   (a) Seventh- 0.64:1
   (b) Sixth - 0.74:1
   (c) Fifth - 1.00:1
   (d) Fourth - 1.43:1
   (e) Third - 1.91:1
   (f) Second - 3.51:1
   (g) First - 7.63:1
(h) Reverse - 4.80:1

g. Transfer Case

(1) Make and model

(a) Oshkosh 30000 Series

(2) Type

(a) Three shaft, single speed with torque proportioning differential with manual differential lock

(3) Ratio

(a) 1.271:1

(4) Torque Split

(a) 32% Front, 68% Rear

h. Axles

(1) Axles Configuration

(a) 6 x 6 – three axles

(2) Make and Model

(a) Oshkosh 7-ton truck axle

(3) Related capacity

(a) Front Axle - 16,000 lbs

(b) Intermediate Axle - 23,500 lbs

(c) Rear Axle - 25,500 lbs

(4) Type

(a) Full time all wheel drive

(b) Fixed center differential and planetary hub reduction

(5) Inter-Axle Differential Lock
(a) CTIS-controlled terrain selection with manual override

(6) Intra-Axle Differential Lock

(a) Controlled by CTIS Terrain selection on all axles, with manual override

(7) Gear Ratios

(a) Final - 6.00:1

(b) Differential - 1.687:1

(c) Wheel Drive - 3.556:1

i. Steering System

(1) Type

(a) R. H. Shepard integral power steering with booster and separate fluid reservoir

(b) Steering Gear Ratio - 18:1

(c) Turning Circle

1) MK27 and MK28

a. 94 feet wall to wall

2. Suspension

a. Type

(1) Oshkosh Modular Independent Suspension, coil spring, A-arm

b. Wheel Travel

(1) Front Axle - 16.0 inches

(2) Intermediate Axle - 12.8 inches

(3) Rear Axle - 12.8 inches

c. Roll Stability

(1) Anti-Roll bar on axle #2 and #3
3. Tires

   a. Type: 16.00R20 XZL
   b. Quantity: Six, 500lbs each.
   c. Additional Capability
      (1) Limp home capability in case of flat tire where CTIS cannot maintain pressure. Note- truck does not have a spare.
   d. Tire Speed:
      (1) Normal Highway Max- 65mph
      (2) Limp Home
         a) Cross country/trails – 5mph
         b) Secondary roads – 10mph
         c) Highway – 15mph
LESSON TOPIC 1.3 Cab Controls

A. Introduction

During this lesson you will become familiarized with, and learn the functions of the cab controls within the MTVR.

B. Enabling Objectives

1.9 **DESCRIBE** the Cab Control functions of the MTVR in accordance with USMC TM 10629.10A.

C. Topic Outline

1. Cab Controls
   a. Cab mounted foot controls
      (1) Steering lock
      (2) Service Brake Pedal
      (3) Throttle Control
b. Cab mounted hand controls

   (1) Seatbelt columns

      (a) Adjustment Columns

      **NOTE:** If required adjust height of columns until shoulder harness positions across shoulder and NOT across face or under shoulder.

   (2) Retainer clip

c. Steering column mounted control

   (1) Turn Signal Lever

   (2) Emergency flasher:

      (a) To turn on – push red switch inward

      (b) To turn off – pull out

   (3) Dimmer switch: Push button to raise or lower headlight beams.
d. Dash controls


(2) Blackout select:  Press smaller bottom switch up and hold while pressing main switch up (blackout) or down (normal) – Releasing small switch locks main switch in selected mode.


NOTE: If headlight switch is on, and panel dimmer is off, all display lights on CTIS and transmission shift pad will be off.

NOTE: Auxiliary items will not work under 85 psi.

(4) Panel Dimmer

(5) Windshield Wipers

(6) Windshield Washer
(7) CTIS ON/OFF Switch: Used to partially disable the CTIS operating in temperatures below 0°F. Normally will be in the down position.

(8) Overspeed Check Tires light: When OVERSPEED light is lit indicates vehicle speed exceeds maximum allowable speed as determined by CTIS.

(9) Check Tires: When on, light indicates that substantial damage may have occurred to one or more tires.

(10) Load Ranges

(11) Terrain Settings

(a) Highway – HWY: Improved paved roads

(b) Cross-Country – CC: Non-paved, secondary roads, and hard packed surfaces

(c) Mud, Sand, and Snow – MSS: Soft surface trails and other unimproved surfaces

(d) Emergency – EMER: Extremely low tire pressure to help free a stuck vehicle or to travel short distance over terrain known to require very low tire pressure.
e. Gauges

(1) Engine Oil Pressure Gauge
(2) Air Pressure Gauge
(3) Volt Gauge
(4) Fuel Gauge
(5) Transmission Oil Temperature Gauge
(6) Water Temperature Gauge
f. Instruments

(1) Tachometer/Hour Meter

(2) Speedometer

(3) Odometer/Trip Odometer

   (a) Displays will blackout when the cab average air temperature drops below approximately – 4 degrees F.

   (b) Will continue to record information.

(4) Trip Odometer Reset
g. Warning Lights

(1) Left Turn Indicator

(2) Automatic Traction Control (ATC)

(3) Anti-lock Brake System (ABS): Lights steadily for two-second bulb check whenever ignition switch is turned on. Lights turn OFF after bulb check if no ABS malfunctions. Illuminates steady when ABS is malfunctioning. Flashes continuously when CC, MSS, and EMER modes are activated.

(4) Water Temperature Light: Lights when coolant temp reaches 235°F. Cooling system fan turns ON when temp is 205°F. Audible alarm will also sound.

(5) High Transmission Temperature: Lights when transmission fluid temp is 300°F. Audible alarm will also sound. (normal 160-250°F)

(6) Check Transmission Light: Lights when transmission fluid temp reaches 250°F.
(7) Engine Warning Indicator light: Indicates engine problem detected by Electronic Control Module (ECM).

(8) Park Brake Indicator Light.

(9) Oil PSI Warning Light: Illuminates when engine oil pressure is below 5 psi.

(10) Low Air 1 light: Illuminates when front air system pressure drops between 64 and 76 psi.

(11) Low Air 2 light: Illuminates when rear air system pressure drops between 64 and 76 psi.

(12) Right Turn Indicator.

(13) Winch Indicator light: Illuminates when winch is activated.
(14) Check Engine light: Illuminates when coolant temp reaches 217°F or when oil pressure is low

(15) Lube Filter light: Illuminates when oil filter requires servicing or replacement

(16) Low Fuel Light (Yellow)

(17) Fan Off warning light: Illuminates when engine fan lockout circuit is activated during fording operations

(18) High Idle Light (Red)

(19) High Beam Indicator (Blue)
(20) Drive-line Lock

(a) Transfer Case and Inter-Axle Locks

(b) Transfer Case, Inter-Axle Locks and Rear Intra-Axle Locks

(c) Transfer Case, Inter-Axle, Front and Rear Intra-Axle Locks (Full Lock-Up)
h. Dash Switches

(1) High Idle: Raises engine idle speed to 1500 rpm when in the up position

(2) Winch ON/OFF: Activates power to winch

(3) Winch OUT/IN: Controls winch operation from inside the cab – UP – cable in, DOWN – cable out must hold switch in at desired position to affect winch operation

(4) Engine Brake (2-Position Switch)

(5) High/Med/Low (3-Position Switch)

(6) Driveline lock switch: Manually overrides CTIS by sequentially engaging locks for transfer case and all axles

(7) ABS – DIAG switch: Turns ON anti-lock brake system diagnostics ABS light will illuminate

(8) Fan Ford (2-Position Switch)
i. Transmission Control Panel

(1) Reverse (R) – Use for backing up

(2) Neutral (N) – Use for starting engine, or for leaving the vehicle running unattended

(3) Drive (D) – Use for all normal driving conditions. Transmission will upshift and downshift automatically.

(4) Shift UP/ DOWN (arrows) – When in drive, the button allows operator to increase and decrease gear range being used by the transmission. Gear 7 is the highest available setting and default when D is first pushed upon startup.

(5) Mode button – (used with the winch & dump truck) - Activates the Power Take Off (PTO). Button serves no purpose in cargo without a SRW.
(6) Selection display mode – Displays transmission setting operator has selected. Display will show “R” for Reverse, “N” for Neutral. When “D” is selected, display will show top gear of range selected by operator. Note: Number 3 is displayed when engine brake/retarder system is active.

j. Fan Controls

(1) Fan Control Knob

(2) Heater Control

(3) Vent Control

(4) Cab Air Directional Control

k. Air System Controls

(1) Air Pressure Gauge

   (a) Red Needle indicates rear system

   (b) Green needle indicates front systems
(2) Parking Brake (yellow)

(3) Trailer Air Supply (red)

(4) Air Filter Restriction Indicator

(5) 12 VDC Aux Receptacle

1. Battery Disconnect (Battle Switch)
A. Introduction

During this lesson you will learn to identify, inventory and stow collateral equipment components of the MTVR.

B. Enabling Objectives

1.10 **DESCRIBE** the MTVR Collateral Equipment in accordance with USMC TM 10629.10A

1.11 **DESCRIBE** the MTVR Collateral Equipment Storage locations in accordance with the USMC TM 10629.10A

1.12 **INVENTORY** the MTVR Collateral Equipment in accordance with USMC TM 10629.10A

C. Topic Outline

1. Collateral Equipment – Two categories
   a. USMC TM 10629.10A, Appendix B
      (1) Section II, Component of End Items (COEI)
      (2) Section III, Basic Issue Items (BII)
   b. Components of End Item (COEI):
      (1) Air intake stack assembly
      (2) Bag, cargo cover storage
      (3) Bow
(4) Cargo cover
(5) Clamp (air intake stack)
(6) Cab side wall (crew)
(7) Dropside
(8) Exhaust stack assembly
(9) Nut (ladder strut installation)
(10) Ladder
(11) Ladder strut
(12) Locknut (secures air intake assembly to mast)
(13) Rod and Tube assembly for dropsides
(14) 28 ft. Rope, for dropsides and troop seat stowage
(15) Screw (Ladder strut installation)
(16) Screw (secures air intake assembly to mast)
(17) Screw, secures tailgate to cargo bed
(18) Stave assembly
(19) Stave Corner Bow
(20) Stowage, door
(21) Strap (secures 5 gallon can)
(22) Strap, bow stowage
(23) Strap, safety for backrests
(24) Strap, troop seat stowage
(25) Strap, cargo cover stowage
(26) T-Bolt, locking handle (dropsides)
(27) Tailgate
(28) Troop seat assembly
(29) Troop seat assembly
(30) Troop seat backrest (right rear)
(31) Troop seat backrest (left rear)
(32) Troop seat backrest (front)
(33) Washer, secures tailgate to cargo bed
(34) Wiper blade arm assembly
c. Basic Issue Items (BII):

(1) Bag assembly, pamphlet

(2) Bag, canvas, battery connection kit (cold weather starting kit)

(3) Bag, tire changing tools

(4) Bag, tool, general

(5) Cable, 4/0 ga (cold weather starting kit)

(6) Chain, winch single hook

(7) CTIS cap (limp home)

(8) CTIS plug (limp home)

(9) Extension, 3 inch ¾ drive

(10) Extinguisher, fire

(11) Flexible adapter, grease gun

(12) Grease gun
(13) Hammer
(14) Handle, extension
(15) Handle, socket wrench
(16) Hex nut, 1 1/8 G5 (limp home)
(17) Hose assembly, #6
(18) Hydraulic jack with handle
(19) Intake adapter, air
(20) Kit, highway warning
(21) Kit, combination tool, hand
(22) Lug, terminal negative (cold weather starting kit)
(23) Lug, terminal positive (cold weather starting kit)
(24) Padlock set (BII box)
(25) Padlock, w/o chain (steering wheel)
(26) Rain cap assembly, exhaust
(27) Plate, jack base
(28) Pliers, 10 inch
(29) Ramp, tire
(30) Screw, battery clamp
   (cold weather starting kit)
(31) Screwdriver, flat tip
(32) Screwdriver, cross tip
(33) Screwdriver, flat tip (for driveline lock solenoids)
(34) Snatch block
(35) Socket, 33 mm ¾ SPL
(36) Socket, 1 1/8 inch, ¾ drive, standard
(37) Strut, limp home
(38) T-Bolt, locking handle
(securitying tire ramps)

(39) Tire inflator/gauge (w/10 ft airline)

(40) Tool, valve core

(41) Washers, flat (limp home)

(42) Wrench, adjustable, 12 inch

(43) Wrench, 5/16 allen

(44) Wrench, 3/32 allen

(45) Wrench, crescent, 8 inch

(46) Wrench, ISO lock spanner

(47) Wrench, open end, ¾ and 7/8

(48) Wrench, open enc, 1 5/8 inch
d. Additional Authorized List (AAL)

(1) Appendix C lists additional items authorized for the support of the 7 ton truck. These items are a using unit responsibility to procure when unit commander determines there is a requirement for them.

(2) Items include complete descriptions, national stock numbers, and part numbers to help you identify the items.

2. Collateral Equipment Stowage

a. Crew seat

b. Rear cargo box, driver side
c. Ramp, Tire Stowage

d. Ladder

e. Troop seats & drop sides

f. Staves, Bows, and Tailgate
JOB SHEET
1.4-1
MTVR COLLATERAL EQUIPMENT STOWAGE

A. Introduction

This job sheet will evaluate your ability to properly inspect Collateral Equipment to include counts, proper stowage and safety issues.

Ensure you physically inspect each item on the checklist. Explain to the instructor all key points of its use, storage and accountability.

This is a training opportunity - Do not continue without fully understanding each step.

B. References

1. USMC TM 10629.10A

C. Job Steps - Collateral Equipment Stowage (intended for training only)

<table>
<thead>
<tr>
<th>1. BASIC ISSUE ITEMS:</th>
<th>U/I</th>
<th>SAT</th>
<th>UN-SAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Bag assembly, pamphlet</td>
<td>1</td>
<td></td>
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</tr>
<tr>
<td>1. Tech Manual 10629.10A</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Bag, canvas, battery connection kit</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1. Cable, battery, 4/0 ga</td>
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<tr>
<td>2. Lug, terminal, negative</td>
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<tr>
<td>3. Lug, terminal, positive</td>
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</tr>
<tr>
<td>4. Screw, battery clamp</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Bag, tire changing tools</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Extension, 3in ¼ drive</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Handle, extension</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. T-Handle, socket wrench</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. CTIS plug (limp home)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Clevis (shackle)</td>
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</tr>
<tr>
<td>d. Bag, tool, general</td>
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### MTVR COLLATERAL EQUIPMENT STOWAGE

<table>
<thead>
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<tr>
<td>2. Pliers, 10 inch</td>
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<tr>
<td>3. Socket, 33-mm, ¾” SPL</td>
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</tr>
<tr>
<td>4. Socket, 1-1/8, ¾’ drive, standard</td>
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</tr>
<tr>
<td>5. Wrench, adjustable, 12”</td>
<td>1</td>
</tr>
<tr>
<td>6. Wrench, adjustable, 8”</td>
<td>1</td>
</tr>
<tr>
<td>7. Wrench, 5/16 allen</td>
<td>1</td>
</tr>
<tr>
<td>8. Wrench, open end, ¾” and 7/8”</td>
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</tr>
<tr>
<td>9. Wrench, open end 1-5/8”</td>
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<tr>
<td>10. Wrench, ISO Lock spanner</td>
<td>1</td>
</tr>
<tr>
<td>11. Screwdriver, flat tip</td>
<td>1</td>
</tr>
<tr>
<td>12. Screwdriver, cross tip</td>
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</tr>
<tr>
<td>13. Screwdriver, flat tip (driveline lock solenoids)</td>
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<tr>
<td>14. Tool, valve core</td>
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<tr>
<td>e. Chain, winch single hook (MK28)</td>
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</tr>
<tr>
<td>f. Snatch block (MK28)</td>
<td>1</td>
</tr>
<tr>
<td>g. Chock, wheel track</td>
<td>2</td>
</tr>
<tr>
<td>h. CTIS cap (limp home)</td>
<td>1</td>
</tr>
<tr>
<td>i. Fire extinguisher</td>
<td>1</td>
</tr>
<tr>
<td>j. Gloves, leather, heavy</td>
<td>1</td>
</tr>
<tr>
<td>k. Grease gun assembly (gun &amp; adapter)</td>
<td>1</td>
</tr>
<tr>
<td>l. Manual, lubrication instructions</td>
<td>1</td>
</tr>
<tr>
<td>m. Air Hose 25ft</td>
<td>1</td>
</tr>
</tbody>
</table>
## MTVR COLLATERAL EQUIPMENT STOWAGE

| 1. Tire inflator/gauge                        | 1 |
| n. Hydraulic jack with handle                | 2 |
| o. Kit, highway warning                      | 1 |
| p. Kit, combination tool, hand               | 1 |
| q. Padlock set with chain                    | 2 |
| r. Padlock, without chain                    | 1 |
| s. Rain cap assembly, exhaust                | 1 |
| t. Intake adapter, air                       | 1 |
| u. Plate, jack base                          | 1 |
| v. Ramp, tire                                | 2 |
| 1. T-bolt (securing tire ramps)              | 1 |
| 2. T-bolt, locking handle                    | 1 |
| w. Strap (secures 5-gal can)                 | 1 |
| x. Strap, safety, for backrests              | 1 |
| y. Strut, limp home                          | 2 |
| 1. Hex nut 1- 1/8 G5 (limp home)             | 4 |
| 2. Washers, flat (limp home)                 | 4 |

### 2. COMPONENTS OF END ITEM 7-Ton MTVR

<table>
<thead>
<tr>
<th></th>
<th>U/I</th>
<th>SAT</th>
<th>UN-SAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Air intake stack assembly</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Bag, cargo cover storage</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Cargo cover</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Bow</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Stave</td>
<td>18</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### MTVR COLLATERAL EQUIPMENT STOWAGE

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>f. Stave corner bow</td>
<td>18</td>
</tr>
<tr>
<td>g. Strap, bow stowage</td>
<td>1</td>
</tr>
<tr>
<td>h. Strap, troop seat stowage</td>
<td>4</td>
</tr>
<tr>
<td>i. Strap, cargo cover</td>
<td>1</td>
</tr>
<tr>
<td>j. Exhaust stack assembly</td>
<td>1</td>
</tr>
<tr>
<td>1. Locknut (secures air intake assembly to mast)</td>
<td>2</td>
</tr>
<tr>
<td>2. Screw (secures air intake assembly to mast)</td>
<td>2</td>
</tr>
<tr>
<td>3. Clamp (air intake stack)</td>
<td>1</td>
</tr>
<tr>
<td>k. Ladder</td>
<td>1</td>
</tr>
<tr>
<td>1. Ladder strut</td>
<td>2</td>
</tr>
<tr>
<td>2. Nut (ladder strut installation)</td>
<td>2</td>
</tr>
<tr>
<td>3. Screw (ladder strut installation)</td>
<td>2</td>
</tr>
<tr>
<td>l. Rod and tube assembly for dropsides</td>
<td>2</td>
</tr>
<tr>
<td>(includes cotter pin and washer)</td>
<td></td>
</tr>
<tr>
<td>m. 28ft rope, for dropside and troop seat stowage</td>
<td>1</td>
</tr>
</tbody>
</table>
A. Introduction

During this lesson you will learn about the Preventative Maintenance Checks and Services (PMCS) table, as well as the MTVR systems that require pre-operational checks prior to starting and operating the vehicle.

B. Enabling Objectives

1.13 **DESCRIBE** the First Echelon Maintenance procedures in accordance with USMC TM 10629.10A

1.14 **PERFORM** First Echelon Maintenance for the MTVR in accordance with USMC TM 10629.10A and EO Basic

C. Topic Outline

1. First Echelon Maintenance

   a. Preventive Maintenance Checks and Services (PMCS), this table located in the Tech Manual (TM 10629-10A) and contains checks and services necessary to ensure the 7-ton Truck is ready for operation.

   b. Table breakdown:

      (1) Item Number

      (2) Interval

      (3) Before (B)

      (4) During (D)

      (5) After (A)

      (6) Monthly (M)

      (7) Item to be inspected procedures

      (8) Not mission capable if
### Item to be inspected procedures:

<table>
<thead>
<tr>
<th>Item No.</th>
<th>INTERVAL</th>
<th>MACHINE GUN MOUNTING KIT</th>
<th>SELF RECOVERY WINCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td></td>
<td>a. Check machine gun mount screws…</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td></td>
<td></td>
<td>a. Check for.....</td>
</tr>
</tbody>
</table>

#### c. Pre-Start Checks

1. Cab and Hood Exterior
   
   (a) Inspect cab (1) and hood (2) for damage.
   
   (b) Inspect cab doors (3) for damage or misalignment.
(c) Inspect for broken, cracked, or loose mirrors (4).

(d) Check under vehicle for fuel, oil, transmission fluid or coolant leakage.

(e) Check cab mounts (5) and cab shocks (6) for damage.

(f) Inspect prop rod (7) and springs (8) for damage.

(g) Inspect front hard-lift (9) for broken welds and loose and broken or missing screws.

(2) Fuel Tank

**WARNING:** Do not perform fuel system check while smoking or near flame, fire or sparks. Fuel could ignite, causing damage to vehicle, severe injury or death.

**CAUTION:** Do not fill fuel tank above full-level line on outside tank or fuel spillage will occur.

(a) Check that strainer (1) is in place and clean. Ensure fuel cap (2) is securely tightened.
(b) Check fuel tank (3) for leaks or damage.

(c) Check fuel hoses and connections for leaks, damage.

(d) Check fuel tank mounting hardware and liners (4) for looseness or damage.

(e) Inspect fuel sending unit (5) for frayed or damaged wires or connectors

d. General Maintenance Procedures

(1) Cleanliness

(2) Nuts and Screws

(3) Welds

(4) Electric wires and connectors

(5) Fluid lines and fittings
(6) Damage

(7) Inspect Collateral Equipment

(8) Corrosion Control

e. Visual Detection of Corrosion

(1) Steel - ________________________________

(2) Aluminum - ________________________________

(3) Brass - ________________________________

(4) Electrical Connection - ________________________________

f. Fluid Leakage:

(1) Class I – Seepage of fluid indicated by wetness or discoloration not great enough to form drops

(2) Class II – Leakage of fluid great enough to form drops but not enough to cause drops to fall

(3) Class III – Leakage of fluid great enough to form drops that fall

NOTE: Any fuel leak is considered a Class III leak, and must be repaired before operating the vehicle

g. Prestart checks using MRC cards

(1) MRC cards are part of the 3M System and are used to inspect vital systems and components of the MTVR before starting. You will be required to perform a prestart check before using the vehicle.

(2) Prestart procedures:

(a) Ensure vehicle is parked with engine stopped.

(b) Inspect hoses/hose connections for deterioration/leaks.

1) WARNING: Avoid repeated/prolonged contact with hazardous materials. Wash affected areas with soap and water upon completion of task or prior to eating, drinking, smoking, or applying cosmetics.

(c) Check crankcase oil level.
(d) Check engine drive belts.
(e) Check cooling system.
(f) Inspect exhaust system.
(g) Inspect fuel tank for leaks, damage, or missing strainer or fuel cap.
(h) Drain water from fuel/water separator.
(i) Inspect hydraulic reservoir for leaks or damage.
(j) Open battery box and remove battery cover.
(k) Check batteries fluid levels and inspect terminals.
(l) Reinstall battery cover.
(m) Close and securely latch battery cover.
(n) Check power steering oil level.
(o) Inspect lighting system.
(p) Check electrical connectors/gladhands for damage.
(q) Check ladder and tailgate hardware for damage or missing hardware.
(r) Inspect tires.
(s) Inspect winch system for damage or missing hardware.
(t) Inspect all glass and mirrors for cracks, broken or loose connections.
(u) Test windshield washers system and wipers.
(v) Inspect seat belts for fraying, wear, and proper installation.
(w) Perform brake test.
(x) Actuate horn and listen for normal sound.
(y) Test parking brake.
(z) Check automatic transmission oil level.
LESSON TOPIC 1.5  First Echelon Maintenance

(aa) Unlatch and stow hood support rod; close and securely latch vehicle hood.

(bb) Inventory collateral equipment in accordance with the collateral equipment list, if applicable.

(cc) Inspect exterior body of vehicle for damage and abnormal wear.

(dd) Report all discrepancies to Work Center Supervisor.

(ee) Return equipment to readiness condition.

Note: Comply with Local Station Procedures for handling HAZMAT disposal.
A. Introduction

This job sheet introduces the use of Maintenance Requirement Cards (MRC) to inspect pre-trip items and ensure the MTVR you are operating is safe and in good working order. You will be required to touch or point out each item you are checking and explain to the instructor all key points of its use, storage and accountability. This is a pass/fail test.

Ensure you physically inspect each item on the checklist.

This is a training opportunity - Do not continue without fully understanding each step.

B. References

1. USMC TM 10629.10A

2. OPNAV 4790/85, Maintenance Requirement Card (MRC), Pre-Operational Check, Maintenance Index Page (MIP) #5737.

C. Job Steps for Prestart Checklist

Note: This checklist is for training only, in the fleet you will use the most current MRC card(s) verified via SYSCOM, when performing this check.

<table>
<thead>
<tr>
<th></th>
<th>Check</th>
<th>Verified</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prestart Checklist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>Ensure vehicle is parked with engine stopped.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>Inspect hoses/hose connections for deterioration/leaks.</td>
<td></td>
</tr>
<tr>
<td>WARNING: Avoid repeated/prolonged contact with hazardous materials. Wash affected areas with soap and water upon completion of task or prior to eating, drinking, smoking, or applying cosmetics.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>Check crankcase oil level.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1) Remove crankcase dipstick</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2) Ensure engine oil is at full mark; refill as required</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3) Reinsert crankcase dipstick</td>
<td></td>
</tr>
</tbody>
</table>
d. Check engine drive belts.
   (1) Check engine drive belts for:
       (a) Wear
       (b) Cuts
       (c) Cracks
       (d) Glazing
       (e) Fraying
       (f) Proper tension; approximately ½” deflection halfway between pulleys

e. Check cooling system.
   (1) Slowly loosen surge tank cap using a rag to release residual pressure
   (2) Remove surge tank cap
   (3) Ensure coolant is at COLD FULL; refill as required
   (4) Reinstall and tighten surge tank cap
   (5) Inspect cooling hoses for cracks, weathering and leakage
   (6) Inspect cooling hose clamps for tightness

f. Inspect exhaust system.
   (1) Visually inspect exhaust system for cracks, holes and corrosion
   (2) Inspect coupling clamps for tightness
   (3) Verify rain cap operates freely

g. Inspect fuel tank for leaks, damage, or missing strainer or fuel cap.

h. Drain water from fuel/water separator.

i. Inspect hydraulic reservoir for leaks or damage.

j. Open battery box and remove battery cover.

k. Check batteries fluid levels and inspect terminals:
   (1) Remove batteries vent/fill plugs
   (2) Ensure batteries fluid levels are just below bottom of fill tube 5/8” above separators; refill as required
   (3) Reinstall batteries vent/fill plugs
   (4) Inspect batteries cables for fraying, cuts and deterioration
   (5) Inspect batteries terminals for tightness

l. Reinstall battery cover.
### MTVR FIRST ECHELON MAINTENANCE

<table>
<thead>
<tr>
<th>Action</th>
<th>Check</th>
<th>Verified</th>
</tr>
</thead>
<tbody>
<tr>
<td>m. Close and securely latch battery cover.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n. Check power steering oil level:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Remove power steering dipstick</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Ensure fluid is at FULL COLD mark; refill as required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Reinsert power steering dipstick</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o. Inspect lighting system.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Inspecting for proper illumination:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Parking lights</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Panel lights</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) High and low beam headlights</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Tail lights</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) Brake lights</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) Backup light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) Left and Right turn signal lights</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(h) Interior lights</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Clearance lights</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(j) Emergency/hazardous warning lights</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(k) Blackout lights</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Inspect for cracks or broken lenses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p. Check electrical connectors/gladhands for damage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>q. Check ladder and tailgate hardware for damage or missing hardware.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>r. Inspect tires.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Inspect tires for:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Abnormal tread wear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Exposed cords</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Bubbles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Ply separation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) External casing damage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) Blisters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>s. Inspect winch system for damage or missing hardware.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>t. Inspect all glass and mirrors for cracks, broken or loose connections.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>u. Test operate windshield washers/wipers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v. Inspect seat belts for fraying, wear, and proper installation.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## MTVR FIRST ECHELON MAINTENANCE

### Check Verified

<table>
<thead>
<tr>
<th>w. Perform brake test:</th>
<th>Check</th>
<th>Verified</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Start engine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Verify that air restriction indicator indicated GREEN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Ensure proper air system pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Depress brake pedal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Verify proper operation; if pedal can be depressed more than half of its full travel, corrective maintenance is required</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>x. Actuate horn and listen for normal sound.</th>
<th>Check</th>
<th>Verified</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>y. Test parking brake:</th>
<th>Check</th>
<th>Verified</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Verify parking brake is set</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Apply brakes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Shift transmission to DRIVE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Release brakes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Apply minimum accelerator pressure, verify that parking brake holds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Apply brakes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) Shift transmission to NEUTRAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8) Release brakes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(9) Stop engine, in accordance with vehicle operating instructions, if applicable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>z. Check automatic transmission oil level:</th>
<th>Check</th>
<th>Verified</th>
</tr>
</thead>
</table>

**WARNING:** Engine and exhaust components may be hot and could cause burns. Exercise extreme caution when inspecting in and around hot engine and exhaust components.

| (1) Verify transmission temperature is at 160 deg or greater. |       |          |
| (2) Remove automatic transmission dipstick                  |       |          |
| (3) Ensure transmission fluid at HOT RUN band on dipstick.  |       |          |
| Refill as required.                                        |       |          |
| (4) Reinsert automatic transmission dipstick                |       |          |

<table>
<thead>
<tr>
<th>aa. Unlatch and stow hood support rod; Close and securely latch vehicle hood.</th>
<th>Check</th>
<th>Verified</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>ab. Inventory collateral equipment in accordance with the collateral equipment list, if applicable.</th>
<th>Check</th>
<th>Verified</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>ac. Inspect exterior body of vehicle for damage and abnormal wear.</th>
<th>Check</th>
<th>Verified</th>
</tr>
</thead>
</table>
### MTVR FIRST ECHELON MAINTENANCE

<table>
<thead>
<tr>
<th></th>
<th>Check</th>
<th>Verified</th>
</tr>
</thead>
<tbody>
<tr>
<td>ad. Report all discrepancies to Work Center Supervisor.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ae. Return equipment to readiness condition.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Comply with Local Station Procedures for handling HAZMAT disposal
A. Introduction

This information sheet lists the servicing

B. References

1. USMC TM 10629.10A

C. INFORMATION:

<table>
<thead>
<tr>
<th>PART OF VEHICLE</th>
<th>CAPACITY</th>
<th>TYPE/GRADE</th>
<th>BELOW 32 DEGREES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ENGINE OIL</td>
<td>36 QUARTS W/FILTER 32 QUARTS W/O FILTER</td>
<td>15W40</td>
<td></td>
</tr>
<tr>
<td>2. TRANSMISSION</td>
<td>48 QUARTS W/FILTER 38 QUARTS DRIN &amp; REFILL</td>
<td>15W40</td>
<td>OE/HDO10</td>
</tr>
<tr>
<td>3. TRANSFER CASE</td>
<td>6 QUARTS</td>
<td>OE/HDO40</td>
<td></td>
</tr>
<tr>
<td>4. HYDRAULIC RESERVOIR</td>
<td>15 GALLONS W/FILTER (MK25 &amp; 28 only)</td>
<td>15W40</td>
<td>OE/HDO10</td>
</tr>
<tr>
<td>5. POWER STEERING</td>
<td>9 QUARTS</td>
<td>15W40</td>
<td></td>
</tr>
<tr>
<td>6. RADIATOR</td>
<td>40.5 QUARTS</td>
<td>50/50 MIX</td>
<td></td>
</tr>
<tr>
<td>7. RADIATOR SURGE TANK</td>
<td>7 QUARTS</td>
<td>50/50 MIX</td>
<td></td>
</tr>
<tr>
<td>8. AXLES 1 &amp; 3</td>
<td>10.5 QUARTS</td>
<td>GO80W90</td>
<td>BELOW ZERO – GO75W</td>
</tr>
<tr>
<td>9. AXLE 2</td>
<td>13 QUARTS</td>
<td>GO80W90</td>
<td>BELOW ZERO – GO75W</td>
</tr>
<tr>
<td>10. WHEEL ENDS</td>
<td>1.6 QUARTS</td>
<td>GO80W90</td>
<td>BELOW ZERO – GO75W</td>
</tr>
<tr>
<td>11. WINCH GEAR BOX</td>
<td>2 QUARTS</td>
<td>85W140</td>
<td>BELOW ZERO – GO75W</td>
</tr>
<tr>
<td>12. FUEL TANK</td>
<td>80 GALLONS TOTAL 76 GALLONS USABLE</td>
<td>JP8 / DIESEL</td>
<td>KEEP TANK FULL OVERNIGHT</td>
</tr>
<tr>
<td>13. WIRE ROPE</td>
<td>1 TUBE OF LUBE</td>
<td>CW (W-L-751)</td>
<td></td>
</tr>
</tbody>
</table>

(Continued on reverse)
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>14. Windshield Washer Reservoir</td>
<td>1 Gallon</td>
<td>Cleaning Compound Windshield</td>
</tr>
<tr>
<td>15. Grease</td>
<td>(refer to LI 10629-12)</td>
<td>Grease Automotive</td>
</tr>
</tbody>
</table>

Note: Comply with Local Station Procedures for handling HAZMAT disposal
A. Introduction

During this lesson you will learn key points of the Central Tire Inflation System (CTIS) and the Anti-lock Brake System (ABS) incorporated into the MTVR.

B. Enabling Objectives

1.15 **DESCRIBE** the Central Tire Inflation System of the MTVR in accordance with USMC TM 10629.10A.

1.16 **DESCRIBE** the Anti-lock Braking System of the MTVR in accordance with USMC TM 10629.10A.

C. Topic Outline

1. Central Tire Inflation System (CTIS)

   a. General Information

      (1) Designed to maximize

         (a) Traction
         (b) Mobility
         (c) Ride quality

      (2) Adjust air pressure in all tires to correspond to:

         (a) Cargo setting
         (b) Terrain setting

      (3) CTIS Controller has

         (a) Four terrain settings

            1) Highway (HWY) – for operation on improved paved surfaces
            2) Cross Country (CC) – for operation on non-paved secondary roads and hard packed trails
            3) Mud/Sand/Snow (MSS) – for operation on soft surface trails and other unimproved surfaces
4) Emergency (EMER) for selection of extremely low tire pressure to help free a mired vehicle or to traverse a short distance over a terrain known to require very low tire pressure.

(b) Three Cargo settings

1) 0 – 2 tons
2) 2 – 7.1 tons
3) 7.1 – 15 tons

(4) Settings will affect tire inflation pressure on both the front and rear tires.

(5) Tire pressure is immediately checked and adjusted upon pushing one of the terrain or cargo setting buttons.

(6) CTIS Automatically checks tire pressure every 15 minutes and adjusts the pressure if needed.
(7) Operational when

(a) Engine is running and

(b) CTIS Switch is in the ON position

(8) If air system pressure drops below 85 PSI, the CTIS will automatically stop, tire pressure increases.

(9) CTIS will automatically resume operation when air system pressure rises above 115 PSI.

2. WARNINGS

a. Operator must fully understand the operation of the CTIS. Read the entire contents of paragraph 2-10 prior to operating CTIS. Failure to comply may result in damage to equipment or injury to personnel

3. CAUTIONS

a. When operating the MTVR there are two speed limitations imposed. One limitation comes from the CTIS Terrain setting. The other comes from the driveline lock setting. The lower speed limitation of the two must be adhered to. Failure to comply may result in damage to equipment.

b. DO NOT change the CTIS controller terrain setting while turning a corner or when wheels are slipping. Damage to driveline may result.

c. The Emergency (EMER) button is for extreme conditions only and should not be used for normal driving. Damage to driveline may occur.

d. Select the appropriate CTIS controller settings before entering an area where poor traction conditions are likely to occur. Failure to comply may result in damage to equipment.

e. Adequate air pressure is required to begin, or continue any pressure changing sequence. Failure to comply may result in damage to equipment.

c. If the over speed indicator blinks, and the operator has not selected the EMER (Emergency) setting, the operator should reduce vehicle speed and/ or shift the CTIS controller to an appropriate terrain setting for the vehicle speed. Failure to comply may result in damage to equipment.

d. If the operator has selected the EMER (Emergency) setting and the audible over speed alarm comes on. The operator should reduce vehicle speed and/ or shift the
CTIS controller to an appropriate terrain setting for the vehicle speed. Failure to comply may result in damage to equipment.

e. CTIS will up shift automatically after 90 seconds. 30 seconds after alarm sounds

f. If Over Speed indicator comes on solid without the audible alarm. The operator must assume that automatic Over Speed protection feature is no longer operable and caution must be used to NOT exceed speed parameters. Failure to comply may result in damage to equipment.

g. If the Run Flat indicator light comes on, the operator should be aware that tire damage might be present and that the CTIS is attempting to compensate for this damage.

h. If the Check Tire indicator comes on, the operator should stop and refer to the proper sections of the CTIS operational paragraph. Failure to comply may result in damage to equipment.

i. If two terrain setting indicators turn solid, the operator should stop the vehicle and refer to the proper sections of the CTIS operational paragraph. Failure to comply may result in damage to equipment.

j. If the CTIS controller flashes the four terrain setting indicators as well as the Run Flat indicator, the operator should stop the vehicle and refer to the proper section of the CTIS operational paragraph.

k. Prior to operating the CTIS in temperatures below 0 degrees F. the CTIS will need to be disabled. Failure to comply may result in damage to equipment.

l. The CTIS controller cargo load setting must be changed as required immediately upon adding or removing cargo from the vehicle. Failure to comply may result in damage to equipment.

(1) With vehicle running select appropriate terrain setting on CTIS controller

(2) Select appropriate cargo load setting on CTIS controller

4. Terrain Settings

a. Highway: For operation on improved surfaces

b. Cross-Country: For operation on non-paved secondary roads and hard-packed trails

c. Mud, Sand, and Snow: For operation on soft-surface trails and other unimproved surfaces
d. Emergency: For selection of extremely low tire pressure to help free a mired vehicle or to traverse a short distance over a terrain known to require very low tire pressure.

1) The emergency mode is for extreme conditions only and should not be used for normal driving conditions. Failure to comply may result in damage to equipment.

2) Prior to selecting EMER (Emergency) setting, the vehicle must be traveling below 5 MPH, maximum allowable speed for that setting.

e. Selection of Terrain Setting

1) Indicator light next to selected button will blink.

2) Light will continue to blink until tire pressure has been adjusted to this setting.

3) Once pressure of tires have been adjusted. Light will stop blinking and stay on steady.

4) Indicator will blink briefly every 15 minutes when CTIS checks and adjust tire pressure.

5) Each terrain setting has a maximum allowable speed.

   a) Highway- 65 MPH

   b) Cross-Country- 40 MPH

   c) Mud, Sand, and Snow- 15 MPH

   d) Emergency- 5 MPH

6) Each setting also dictates a default driveline lock configuration, which will be displayed via icons on the instrument panel.

7) Automatic up-shift in the CTIS terrain mode does not automatically dictate a driveline lock change.

8) Driveline lock setting will not change until the parameters listed in the Tech. Manual are exceeded.

**NOTE:** When emergency (emer) position is selected by the operator, the overspeed indicator will blink when tire pressure has reached the pressure setting appropriate for the emergency (emer) setting.
5. Tire Over Speed Protection

a. If vehicle speed does not decrease to an allowable level during this predetermined time, an alarm will sound and the OVER SPEED indicator will blink.

b. Used to prevent damage to tires.

c. Exceeding speed for terrain setting

(1) CTIS will monitor 15 to 90 seconds depending on terrain setting.

(2) Once the alarm sounds, the operator has 30 seconds to adjust vehicle speed or up-shift to a new CTIS terrain setting

(3) If operator does not adjust vehicle speed, CTIS will automatically up-shift terrain setting to appropriate speed of vehicle.

6. Cargo Load Settings

d. Three cargo load settings

(1) Empty- 0 to 2 Tons

(2) Partial- 2 to 7.1 Tons

(3) Full Load- 7.1 to 15 Tons

e. Switching cargo load setting will result in a tire pressure check and a possible adjustment in tire pressure, as determined by CTIS.

f. Cautions and Notes

(1) The CTIS controller cargo setting must be changed as required immediately upon adding or removing cargo from the vehicle. Damage to vehicle may result
(2) When the cargo load setting is at full load, only highway and cross-country terrain settings are allowed

(3) When the cargo load setting is at full load, the transmission will not allow selection of first (1st) gear

7. Run Flat Mode

    g. The Run Flat feature should not be used in an attempt to inflate tires with substantial damage. Use of the run flat feature in these circumstances may result in other tires losing pressure.

    h. Engage Run Flat

        (1) Vehicle has sustained minor tire damage so operator can continue the mission.

        (2) Preventative measure when operator is traveling in conditions where tire damage is likely.

    i. The CTIS in the 7-Ton Truck operates two channels. One channel monitors and adjusts the two tires on the front axle. The other channel monitors and adjusts the tires on the back two axles.

    j. Intervals between tire pressure checks decreases from 15 minutes to 15 seconds.

        (1) Run Flat button indicator will blink indicating it is engaged.

        (2) Stay engaged until CTIS has inflated the low tire to appropriate pressure or for 10 minutes.

        (3) If needed push Run Flat button again to reactivate.

    k. Will automatically be engaged by the CTIS if, during a normal tire pressure check/adjust cycle, the CTIS notices a substantial tire pressure imbalance between tires on a specific channel

        (1) Run Flat feature will stay engaged until the CTIS has inflated the low tire to appropriate pressure.

        (2) If automatically engaged by the CTIS, be aware that tire damage may be present.
(3) When damage becomes too great for Run Flat feature to compensate for, the Check Tire indicator will illuminate.

8. Recommended Modes of Operation

<table>
<thead>
<tr>
<th>ROAD CONDITIONS</th>
<th>CTIS SETTINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HWY</td>
</tr>
<tr>
<td>Highway/Paved &amp; Smooth</td>
<td>X</td>
</tr>
<tr>
<td>Gravel/Smooth</td>
<td>1</td>
</tr>
<tr>
<td>Gravel/Dirt with Potholes or Washboard</td>
<td>X</td>
</tr>
<tr>
<td>Cobblestone/Belgium Block</td>
<td>X</td>
</tr>
<tr>
<td>Mud/Sand/Snow</td>
<td>1</td>
</tr>
<tr>
<td>Fording Hard Bottom</td>
<td>X</td>
</tr>
<tr>
<td>Fording Soft Bottom</td>
<td>1</td>
</tr>
<tr>
<td>Grade – Slight (&lt;10%)</td>
<td>X</td>
</tr>
<tr>
<td>Grade – Moderate (10% - 25%)</td>
<td>X</td>
</tr>
<tr>
<td>Grade – Steep (&gt;25%)</td>
<td>1</td>
</tr>
</tbody>
</table>

9. Check Tires

1. Check Tires Light

   (1) Check Tire indicator automatically illuminates when a consistent and/or substantial leak develops in a tire or air line.
(2) Check Tire Indicator comes on. Operator should stop and assess the situation

(a) Minor tire damage is found, push the Run Flat button and re-assess the situation.

1) If the RUN FLAT button is pushed to allow the CTIS to compensate for minor tire damage, the CHECK TIRE indicator may go out, depending on the severity and type of damage. The CHECK TIRE indicator may come on again once the Run Flat system disengages.

(b) No tire damage is found or if CTIS is able to compensate for the damage, operator should continue with mission.

(c) Major tire damage is found or CTIS is not able to compensate for the damage, use Flat Tire Limp Home procedure.

(3) Excessive air seal leakage.

(a) Excessive air seal leakage on cold weather start up may result in the CHECK TIRE indicator coming on. If upon inspection, no tire damage exists, the operator may continue to operate the vehicle. This condition should correct itself as the seals warm up with use.

(b) If condition continues to exist contact second echelon maintenance

10. Driveline Lock

a. Engaged by CTIS, selected on control panel.

b. Driveline Lock Over Speed protection.

(1) If the vehicle exceeds the maximum allowable speed for the driveline lock setting it is in for more than 30 seconds, the CTIS automatically shifts the driveline lock configuration to the next setting appropriate for the speed of the vehicle.

(a) When an automatic shift in driveline lock setting occurs the icons on the instrument panel will change to show new setting.
c. Default Driveline Lock setting:

(1) T-Case and Inter-Axle

a) Maximum Allowable Speed – 30 MPH

b) Icons Lit – (1)

(2) T-Case, Inter-Axle and Rear Intra-Axle

a) Maximum Allowable Speed – 10 MPH

b) Icons Lit – (1), (2)

(3) T-Case, Inter-Axle and Front and Rear Intra-Axle (Full Lock)

a) Maximum Allowable Speed – 10 MPH

b) (1), (2) and (3)

(4) Selected by CTIS.

(5) Generally most appropriate for terrain setting.

(6) Driveline lock switch used to override driveline lock settings
a) Operator can use driveline lock switch to add more locks to the configuration. CTIS will not allow the operator to select fewer locks than the default setting selected by the terrain settings of the CTIS Controller.

b) Override faults cannot be selected in 7.1 – 15 ton and highway mode

d. Manual Driveline Lock:

   (1) When manual driveline lock is used, the automatic speed protection features of the CTIS are no longer operational.

   (2) There are two speed limitations imposed when operating the vehicle.

      a) CTIS Terrain Setting

      b) Driveline Lock Setting

      c) The lower of the two speed limitations must be adhered to. Failure to comply may result in damage to vehicle

      (3) Solenoids – four individual solenoids

1. This solenoid activates the front intra-axle (side to side #1) driveline lock solenoid.

2. This solenoid activates the inter-axle (#2 to #3) driveline lock solenoid.

3. This solenoid activates the rear intra-axle (#2 & #3) driveline lock solenoid.

4. This solenoid activates the Transfer Case driveline lock solenoid.
11. CTIS Controller Displays

**NOTE:** CTIS will automatically shut off when it cannot function properly. Indicator lights will continue to illuminate until problem is corrected.

a. Single Terrain Light
   (1) Flashing- system working to achieve new pressure
   (2) Steady- pressure achieved. Wheel valves closed. System stable
       (a) If encountered frequently notify 2nd Echelon Maintenance

b. Two terrain Lights on
   (1) System has shut off with tire pressure between two settings. Vehicle is still operational.
   (2) CTIS is still operational, desired terrain setting can be re-selected to reatempt pressure change.

c. Check Tire Light (flashing)
   (1) System has shut off due to an air leak or possible tire damage
   (2) Selecting run flat may allow CTIS operation if tire damage is minimal.
   (3) CTIS should not be operated if major damage is found.
   (4) Vehicle is still operational (depending on tire damage)
   (5) Notify Second Echelon Maintenance as soon as possible

d. Five Lights Flashing (four terrain and run flat)
   (1) System has shut off at least one channel (front or rear) due to fault detection of CTIS component
   (2) Vehicle is still operational without CTIS. Operator should verify tire pressures are adequate for desired load and speed

e. No Terrain Lights
   (1) Inadequate vehicle power
   (2) Electrical solenoid fault
LESSON TOPIC 1.6  CTIS & ABS Operations

(3) CTIS is not operational. Vehicle may be operated after operator has verified tire pressures are correct

(4) Headlights on and dash lights off

f. Run Flat Light flashing (with terrain light)

(1) System has detected a low tire or line leak and is working to correct problem


a. Anti-Lock Brake System (ABS)

(1) ABS controlled braking ensures optimum vehicle stability while minimizing stopping distance

(2) When applying service brakes, the ABS monitors all wheels for wheel lock condition

(a) If wheel lock occurs, ABS will adjust the air pressure to the service brakes to eliminate wheel lock.

(b) Once ABS detects that the wheel lock condition is eliminated, it will stop adjusting air pressure to the service brakes.
LESSON TOPIC 1.6  CTIS & ABS Operations

1. Speed sensors monitor wheel rotation
2. Speed signal to ECU
3. Electronic Control Unit (ECU) interprets speed signals and activates valves
4. Hold and release solenoids controls air pressure in the brake chambers
5. Braking force remains at optimum level

Sensors on all configured wheels signals status to ECU
b. Anti-Lock Brake system light.

(1) Lights steadily for a two second bulb check whenever ignition switch is turned on.

(2) Lights turn off after bulb check, if no ABS malfunctions.

(3) Illuminates steady when ABS is malfunctioning.

(4) Light flashes slowly when CTIS is set to CC, MSS, and EMER Terrain settings to indicate the ABS is deep cycling

(a) Indication is normal and does not indicate a malfunction.

**NOTE:** If the abs light indicates a malfunction, the abs and possibly the ATC system may be disabled, the emergency and service brake system remain functional.
c. Automatic Traction Control System (ATC)

(1) Helps improve traction on slippery or unstable driving surfaces by reducing drive wheel slippage.

(2) Constantly monitors the wheel for slip condition.

(a) Wheel slip condition occurs; the ATC system activates and throttles back the engine. **(HIGHWAY MODE ONLY)**

(b) ATC system detects wheel slip condition is no longer present; it will return engine and service brake to normal operating conditions.

(3) ATC Operation

(a) During period of wheel slip, the Electronic Control Unit enters an Automatic Control Mode

   1) High Speed Mode – at highway speed, the engine is throttled back to control spin out.

   2) Low Speed Mode – at lower speeds, both engine and brake control are used to enhance vehicle traction.

   3) Mud and snow mode – the mud and snow option is available with engine and brake control. This function allows more engine power and wheel spin.
d. Automatic Traction Control Light

(1) Illuminates at key on and remains lit until operator presses brake pedal.

(2) CTIS set to highway terrain setting and the ATC light will remain OFF.

   (a) Unless ATC detects a wheel slip condition and activates.

   (b) Light will then flash rapidly until the wheel slip condition is no longer present.

(3) ATC light illuminates steadily when operating the vehicle in the Highway CTIS setting. The ATC is malfunctioning.

(4) If the ATC light indicates a malfunction, the ATC and possibly the ABS system may be disabled. If the ATC and/or ABS is disabled, the emergency and service brake systems remain functional.

(5) ATC light will illuminate steadily.
(a) When CTIS is set to CC, MSS, or EMER Terrain settings.

(b) Indicates the ATC system is disabled.

(c) Does not indicate a malfunction in the ATC.

(d) During periods of wheel slip, the electronic control unit enters an automatic control mode. The modes are as follows:

1) High speed mode- engine control

2) Low speed mode- engine and brake control

3) Mud and snow mode- engine and brake control, allows more engine power and wheel spin

e. ATC Component Function

(1) When brake control is utilized.

(a) ATC valve is activated, diverting supply tank air to the pressure modulator valves on the drive axle(s).

(b) ECU then activates the appropriate solenoids in order to apply brake force to the spinning wheel.

**NOTE:** the automatic traction control (ATC) system cannot increase traction to a particular wheel, can only utilize the available traction
A. Introduction

This is an OPEN BOOK assignment to be completed per the instructor’s requirements. This assignment is to help familiarize you with the MTVR and the U.S. Marine Corps Technical Manual (TM 10629-10A).

B. Materials Required


C. Study Questions

1. CTIS was designed to maximize three functions for improved operation. Which of the following is NOT one of these three functions?
   a. Traction
   b. Cross Country
   c. Mobility
   d. Ride Quality

2. If the air system pressure drops below _____ psi, the CTIS will automatically stop tire pressure increase adjustments. The CTIS will automatically resume operation when the air system pressure rises above _____ ?
   a. 85 / 115
   b. 79 / 115
   c. 85 / 110
   d. 79 / 110

3. The terrain settings cannot be changed while the vehicle is moving.
   a. True
   b. False

4. In the RUN FLAT mode, the intervals between tire pressure checks and adjustments are reduced from _____ minutes to _____ seconds.
   a. 15 / 45
   b. 10 / 45
   c. 10 / 15
   d. 15 / 15
5. NOTE: When operating the vehicle in the CC, MSS, or EMER CTIS setting the ____ system(s) are disabled.
   a. ABS
   b. ATC
   c. ABS and ATC
   d. ATC and ECM

6. How does the MTVR indicate that the ABS system is disabled?
   a. The ABS light will flash slowly
   b. The ABS light will remain steady on
   c. ABS beeping warning will sound
   d. ABS horn will sound and the light will flash slowly

7. If a wheel slip condition occurs, the ATC system activates and throttles back the engine to help reduce wheel slip. If the vehicle is traveling at a speed of less than ____ the ATC will also pulse the service brake system to aid in reducing wheel slip.
   a. 20 mph
   b. 25 mph
   c. 30 mph
   d. 35 mph

8. The engine brake/retarder disengages when engine speed drops below ______rpm in third gear, or ______rpm in second gear, or when accelerator is re-engaged.
   a. 1700/600
   b. 1700/700
   c. 800/1000
   d. 1000/800
9. On the dash, the Water Temperature Light (red) illuminates when the coolant temperature reaches ____ deg F, the cooling system fan turns ON when the coolant temperature reaches ____ deg F?
   a. 200 / 235
   b. 235 / 205
   c. 200 / 235
   d. 245 / 235

10. For grades greater than 25%, initial setting should be ____. If wheels start to slip, adjust CTIS to _____ setting.
    a. MSS / Emer
    b. HWY / MSS
    c. MSS / CC
    d. CC / MSS

11. The maximum speed during Limp Home mode on a secondary road is not to exceed?
    a. 5 mph
    b. 10 mph
    c. 15 mph
    d. 20 mph

12. While operating the MTVR, a tire sustains minor damage and the operator needs to get out of that area, which CTIS selection would be selected?
    a. Highway
    b. Emergency
    c. Mud/Sand/Snow
    d. Run Flat

13. Which CTIS terrain selection would the operator select for “operation on nonpaved secondary roads and hard-packed trails”?
    a. Highway (2)
    b. Cross Country (3)
    c. Mud/Sand/Snow (4)
    d. Emergency (5)
14. According to the “Components of End Item 7-ton Series Truck” (AKA – ancillary parts list) how many Stave Corner Bows should be accounted for, on the MK28?

   a. 14  
   b. 16  
   c. 18  
   d. 19  

   Page # __________

15. According to the Operator/crew preventative maintenance checks and services (PMCS) list, what ‘INTERVAL’ do you inspect the cable hold down for damage and serviceability? (Self Recovery Winch)

   a. B - Before  
   b. D - During  
   c. A - After  
   d. M - Monthly  

   Page # __________
LESSON TOPIC 1.7 Vehicle Operations

A. Introduction

During this lesson you will learn about operating the MTVR under normal, off-road, and emergency conditions.

B. Enabling Objectives

1.17 **DESCRIBE** the procedures for operating the MTVR under normal highway (improved surface) conditions in accordance with USMC TM 10629.10A.

1.18 **OPERATE** the MTVR under normal highway conditions in accordance with USMC TM 10629.10A.

1.19 **DESCRIBE** the procedures for operating the MTVR under off-road conditions in accordance with USMC TM 10629.10A.

1.20 **OPERATE** the MTVR under off-road conditions in accordance with USMC TM 10629.10A.

1.21 **DESCRIBE** the procedures for operating the MTVR under emergency conditions in accordance with USMC TM 10629.10A.

1.22 **OPERATE** the MTVR under emergency conditions in accordance with USMC TM 10629.10A.

1.23 **DESCRIBE** the procedures for operating the MTVR under unusual conditions in accordance with USMC TM 10629.10A.

C. Topic Outline

1. Operating the MTVR
   a. Entering Cab
      
      (1) Do not use steering wheel for handgrip to enter 7-ton truck cab. Use of steering wheel for handgrip may cause sudden violent jerking of vehicle. This may result in severe injury to operator.
(2) When entering or exiting cab, use three point contact system. Failure to comply may result in injury to personnel.

(3) Enter cab using steps and grab handles

b. Seat Adjustment

(1) Driver’s Seat

(a) Adjust seat height as required

(b) Adjust seat forward or backward as required

(c) Seatbelt Adjustment

1) Seatbelt/shoulder harness is two belts combined together. Adjust height of columns until shoulder harness positions across the shoulder and NOT across the face or under shoulder.
(d) Adjust Mirror

(e) Operate Service Lights/Blackout Lights

(2) Crew Seatbelt Adjustment

(a) Seatbelt/shoulder harness is two belts combined together.

(b) Adjust height of columns until shoulder harness positions across the shoulder and NOT across the face or under shoulder.
c. Normal Operation- Start Up

(1) Ensure Pre-start is properly preformed.

(2) Ensure personnel are clear of vehicle before engine start is attempted. Operator must visually check to see that all areas of vehicle are clear of personnel prior to attempting to start engine. Failure to comply may result in severe injury or death to personnel.

(3) The driver is responsible for the safety of the personnel riding on their vehicle. Drivers will refuse to move a vehicle if anyone is in an unsafe position or the vehicle has too many passengers unless otherwise directed by your Unit Commander. Failure to comply may result in serious injury or death to personnel.

(4) Normal Start- Above 32 degrees F.

(a) For procedures on starting engine below 32° F. and in extremely cold weather. Refer to TM 10629.10A.

(b) Apply parking brake by pulling out parking brake valve.

(c) Turn battery disconnect switch to ON position.

(d) Turn ignition switch to ON position and ensure transmission range selector is in “N” – Neutral.

(e) Turn ignition switch to START for approximately 10 seconds or until engine starts.

1) If engine fails to start, wait 15 seconds prior to next start attempt, to allow starter to cool.

2) Do not turn ignition switch to start position while engine is rotating. Failure to comply may result in damage to equipment

3) If ignition fails to start, ignition switch must be returned to OFF position.

4) If ignition fails to start after five start attempts, refer to troubleshooting.

(f) If oil pressure gauge does not show safe operating pressure within 10 to 15 seconds after starting engine, shut down engine immediately.

(g) Run engine at 800 to 1000 RPM for three minutes

(h) Both needles on air pressure gauge read 100 to 125 PSI.
(i) Low Air 1 and Low Air 2 warning light remains illuminated until red and green needle on gauge reach 64 to 76 PSI.

(j) Check Fuel Gauge

(k) Check Oil Pressure Gauge

(l) Water Temp gauge does not read over 220°F.

(m) 24V Volt Gauge reads between 24 and 30 Volt

(n) Air Filter restriction indicator shows green.

1) Vehicle may be operated until air filter restriction indicator reads up to a maximum of 20 inches.

d. Operate Service Brakes

(1) Ensure both needles on air pressure gauge read at least 100 PSI.

   (a) Rapid operation of service brakes will consume compressed air supply and cause automatic spring brake application. Always observe AIR PRESS gauge. Failure to comply could result in damage to equipment or injury to personnel

   (b) If red needle on air pressure gauge reads approximately 45 psi or less, spring brakes will automatically be fully applied causing possible loss of control. Serious injury or death may result.

(2) Push down and hold service brake pedal as required to slow or stop vehicle.

e. Operate Transmission

(1) Ensure engine is running

(2) Push in parking brake control

(3) Ensure transmission range selector is in “N” – Neutral position.

   NOTE: To start or park vehicle, select “N” – Neutral.

(4) Apply service brakes and set transmission range to desired position.

(5) When vehicle is positioned in Drive (D), gear seven is automatically chosen and displayed in digital display window.
(6) To move vehicle backwards, select “R” – Reverse.
   (a) Service brake pedal must be applied and vehicle stopped when shifting among
       D-N-R shift selections
   (b) WARNING: Do not back up without a ground guide. Failure to comply may
       result in damage to vehicle, injury or death to personnel.

(7) Move forward from a stopped position, select “D” – Drive.

f. Operate Engine Brake/ Retarder
   (1) Use Engine brake/retarder when long application of service brakes is not desired
   (2) Only when vehicle tires have good traction.
   (3) Do not apply engine brake/retarder if engine speed is over 2100 rpm. Damage to
       engine may occur
   (4) Set engine brake/ retarder switch to ON.
   (5) Select High, Medium, or Low setting.
   (6) Lift foot off throttle pedal. Engine brake/retarder will automatically slow vehicle.
      (a) When engine brake/retarder switch is activated and vehicle is decelerating, the
          number 3 will be displayed in the display window of the transmission selector.
   (7) Optimum braking occurs with engine between 1650 and 2100 RPM.
      (a) If more braking is required, select Medium or High on Engine Brake/ Retarder
          switch.
      (b) Service brakes may be used in addition to engine brake to obtain maximum
          braking
      (c) Engine brake/retarder disengages when engine speed drops below 1000 rpm in
          3rd gear or 800 rpm 2nd gear or when accelerator is re-engaged.
   (8) No engine braking is required select Low and turn Engine Brake/ Retarder switch
       to OFF.

g. Required Operating Procedures
   (1) Turn on lights as required.
(2) Set CTIS controller to appropriate settings.

(3) Check Fuel gauge.

(4) Check Oil pressure gauge indicates safe range.

(5) After transmission warms up, check transmission oil temperature gauge.

(6) Check Volt gauge.

(7) Check Water temperature gauge.

(8) Apply service brake, set transmission range selector to appropriate range.

(9) Check air filter restriction indicator.

(10) Push in parking brake.

(11) Release service brake, apply throttle.

**WARNING:** Maximized governed engine speed with transmission in neutral is approximately 2125 rpm. Never allow engine speed to exceed this figure. Under load, governed speed is approx. 2100 rpm. If engine is allowed to go over governed speed, serious engine damage can result.

(12) Check engine oil pressure

(a) Engine oil pressure has three monitoring systems, (low oil pressure light, check engine light, and oil pressure gauge).

(b) If two of the three systems indicate a problem, park vehicle and shut down engine

(13) Check engine coolant temperature

(a) Engine coolant temperature has three monitoring systems, (water temperature light, check engine light, and water temperature gauge).

(b) If two of the three systems indicate a problem, park vehicle and idle engine at 800 – 1000 rpm until water temperature cools down

(14) If check engine light illuminates other than at start up, there is a problem in the engine that could cause damage to the engine.
(15) If transmission check light illuminates (at any time other than start up), DO NOT turn off engine or shift transmission to ‘N’ Neutral. Return it to 2nd Echelon maintenance as soon as possible.

(16) Check for correct oil level and high transmission oil temperature.

h. Operating MTVR

(1) WARNING - Increased effort will be required to turn steering wheel if there is a failure of hydraulic steering system or engine stops running. Stop vehicle as soon as road conditions permit. Operating vehicle with impaired steering could result in serious injury or death to personnel

(2) Do not hold steering wheel at full left or full right for longer than 10 seconds. Oil overheating and pump damage can result.

(3) CTIS increases tire pressure when vehicle speed exceeds the allowable speed for each setting. When an increase in speed is required, maintain the lower speed until tires are inflated to correct pressure

(4) Do not allow vehicle to coast in N (neutral). This can result in severe transmission damage and unsafe operation.

(5) Maximized governed engine speed with transmission in neutral is approximately 2125 rpm. Never allow engine speed to exceed this figure. Under load, governed speed is approximately 2100 rpm. If engine is allowed to go over governed speeds, serious engine damage can result.

i. Bringing MTVR to a stop and parking

(1) Lift foot off throttle pedal; allow automatic downshifting of transmission to slow vehicle.

(2) Apply brake until vehicle comes to a complete stop.

(3) Pull out parking brake.

(4) Position transmission range selector in “N” – Neutral.

(a) If the operator leaves the vehicle, even momentarily, when engine is running, the transmission MUST be in N (neutral) and PARKING BRAKE must be engaged. Unexpected and sudden vehicle movement may occur causing injury or death to personnel

(5) Align front tires in straight ahead position.
(6) WARNING - Do not park vehicle on steep grade. Serious injury or death may result

j. Shut Off Engine

(1) Park Vehicle

(2) Shut down engine brake (If Activated)

(3) Shut off all lights and switches.

(4) Prior to shutting down engine, run engine at 800 – 1000 rpm with transmission in neutral for three minutes to allow turbocharger to slow down and cool off. Engine components may be damaged if not allowed to cool down.

(5) Turn engine ignition switch to OFF.

(6) Turn battery disconnect switch to OFF.

(7) Remove (-) negative ground from battery.

3. OFF-ROAD Operations:

a. Before attempting to negotiate terrain conditions such as deep ditches, where axles are likely to be suspended, set CTIS controller and transmission range selector to appropriate settings.

b. Activate CTIS for terrain and load setting

c. Vehicle Adjustments

(1) Mud Flaps need to be pinned on storage hooks located on mud flap brackets. If steep slope is encountered and rear mud flaps are not pinned, damage may result.

(2) Before operating off-road or up steep grades, ensure under-ride bar is adjusted to upper position to allow maximum road clearance. Failure to comply may result in damage to vehicle.
d. Select appropriate transmission range and gear selection.

e. Check gauges and warning lights often.

f. Returning to Off-Road conditions.

   (1) CTIS controller to Cross Country position and select appropriate weight setting

   (2) Check oil pressure

   (3) Check transmission oil temperature gauge

   (4) Check volt gauge

   (5) Check water temperature gauge

   (6) Apply service brake pedal and position transmission range selector in D mode

   (7) Use arrow buttons to select 3, 2, 1, depending on ground conditions

   (8) Push in PARKING BRAKE control valve

   (9) Release service brake pedal and slowly press down throttle pedal until vehicle reaches desired speed

   (10) Accelerate, brake, and steer as required

   (11) Check system gauges often during vehicle operation when returning to on-road conditions, return transmission range selector and CTIS controller to the appropriate settings

   (12) Transmission Range selector

   (13) Mud Flaps

Mud Flaps need to be pinned on storage hooks located on mud flap brackets

Ensure under-ride bar is adjusted to upper position to allow maximum road clearance
(14) Under-ride Bar

g. Steep Grades

(1) **WARNING:** Do not change CTIS controller or driveline lock settings while vehicle is turning or wheels are slipping. Damage to equipment may occur.

(2) Set CTIS controller and engine brake/retarder to appropriate settings.

(a) See table below

<table>
<thead>
<tr>
<th>Road Conditions</th>
<th>HWY</th>
<th>CC</th>
<th>MSS</th>
<th>EMER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade – Slight (&lt;10%)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade – Moderate (10% to 25%)</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade – Steep (&gt;25%)</td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

(b) For grades greater than 25%, initial setting should be CC. If wheels start to slip, adjust CTIS to MSS setting.

(3) Unless uphill grade is extreme, begin with transmission range selector in “D” Drive.

(4) Steady decrease in road speed and engine RPM.

(a) Engine works hardest when carrying loads uphill. Proper use of gears will minimize stress on engine.

(b) If wheels slip, stop vehicle adjust CTIS to EMER setting.

1) Excessive wheel slippage while traveling up steep grade could cause drive line damage.

(5) Check system gauges often.

(6) Once grade is crested, adjust transmission range and CTIS to appropriate settings.
(7) Driving down steep grades.

(a) Do not allow engine speed to go above 2100 rpm when driving downhill or damage to engine can result.

(b) Position transmission range selector to keep engine speed on tachometer between 1000 and 2100 RPM.

(c) Engine brake operates best when engine speed is between 1000 and 2100 rpm. Engine brake will disengage when engine drops below 1000 rpm in third gear and 800 rpm in second gear.

(d) Apply service brake as required.

1) Rapid operation of service brakes will consume compressed air supply and cause automatic spring brake application. Always observe AIR PRESS gauge. Failure to comply could result in damage to equipment or injury to personnel.

(e) Use Engine Brake/ Retarder as required.

(f) Accelerate, brake, and steer as required.

h. Slippery Conditions

(1) Use engine brake/retarder only when vehicle tires have good traction. Use of engine brake/retarder on slick or loose surfaces can cause vehicle to skid and cause injury or death to personnel.

(2) Maximum traction under adverse conditions.

(a) Set CTIS to Mud, Sand, and Snow (MSS) position.

1) Do not change CTIS controller or drive line lock settings while vehicle is turning or wheels are slipping. Damage to equipment may occur.

(b) If conditions warrant, switch to Emergency (EMER).

1) WARNING - When using EMERGENCY mode on CTIS, top speed should not exceed 5 mph. Use extreme care as steering response is limited due to drive line lock configuration.

(c) Tire chains may be required to aid in traction during slippery conditions.
Lesson Topic 1.7 Vehicle Operations

(3) Position transmission range selector
   (a) Drive, “D” mode, use the up/down arrows to select gear
   (b) Lower range gives better control on slick or icy roads as well as on steep downgrades.

(4) Accelerate, brake, and steer as required.

(5) Check system gauges often.

(6) Conditions improve; return transmission range selector and CTIS controller to appropriate settings.

4. Operate under Emergency Conditions
   a. Slave start vehicle.
      (1) Allow vehicle to idle at least 3 to 5 minutes. Operating vehicle before batteries are partially charged may result in alternator overcharging batteries
   b. Loss of Air system pressure.
      (1) If low air light 1 or low air light 2 illuminates and warning buzzer sounds while driving vehicle, check air pressure gauge
      (2) Green needle of air pressure gauge is at 70 psi or less there is loss of air for front brakes
         (a) Leave additional distance between vehicles and decrease speed
         (b) Apply brake pedal earlier than usual when slowing vehicle
         (c) Downshift and use engine brake/retarder switches on HIGH setting as required when slowing vehicle
      (3) Red needle on air pressure gauge is dropping and reading is 70 psi or less
         (a) Downshift, apply engine brake/retarder switches on HIGH setting to control vehicle speed until suitable location is found and stop vehicle immediately
         (b) If possible, for a more controlled stop, pull out parking brake control valve to apply spring brakes on axles no. 2 and 3 before pressure drops below 45 psi
c. Limp Home

(1) Speed not to exceed

<table>
<thead>
<tr>
<th>MODE</th>
<th>SPEED NOT TO EXCEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross Country/Trails</td>
<td>5 MPH</td>
</tr>
<tr>
<td>Secondary Roads</td>
<td>10 MPH</td>
</tr>
<tr>
<td>Highway</td>
<td>15 MPH</td>
</tr>
</tbody>
</table>

(2) Flat tire No. 2 Axle

(3) Flat tire No. 1 Axle

(4) Flat tire No. 3 Axle.

5. Operate under Unusual Conditions

a. Operate vehicle in extreme heat

(1) When operating vehicle in temperatures above 100°F, extra care must be taken to prevent overheating engine and transmission

(2) Observe water and transmission oil temperature gauges closely.

(3) Overheating of engine is occurring if

   (a) Engine coolant temperature exceeds 220°F
   (b) Engine oil pressure drops below normal operating range
   (c) Transmission oil temperature exceeds 250°F
   (d) Stop vehicle for cooling down periods.
   (e) Check engine oil levels often.
   (f) Check air filter restriction indicator frequently.
(g) Allow engine to idle for approximately 3 minutes prior to shut down.

b. Operate in extreme dust conditions.

(1) When operating in extreme dust environments, all fluids, lubricants, and filters should be inspected more frequently and changed as required.

(2) Closely monitor all gauges, lights and air filter indicator.

(3) Allow appropriate distance between vehicles.

(4) At stops, check and drain fuel/water separator (as required)

(5) When possible, park so vehicle does not face into wind.

c. Operate MTVR in Mud, Sand, and Snow.

(1) Check air filter restriction indicator often.

(2) Set CTIS to Mud, Sand, and Snow. (MSS)

(3) Before backing vehicle in mud, sand, or snow, mud flaps must be pinned on stowage hook located on mud flap bracket.

(4) Prior to operating off-road, ensure under-ride bar is adjusted to upper position to allow maximum road clearance

(5) DO NOT spin wheels when beginning to move vehicle.

(6) Maintain constant, slow speed, and keep twice the distance from vehicle ahead.

(7) Do not change controller or driveline lock settings while vehicle is turning or wheels are slipping

(8) Keep vehicle straight whenever possible.

(9) Park Vehicle (MTVR)

(a) Do not face into wind

(b) Clean mud off vehicle as soon as possible.

(c) Clean mud from wheels, brakes, axles, universal joints, steering mechanism, hoses, and radiator as soon as possible.
d. Operate Vehicle in Desert Environment

(1) Temperatures may change as much as 70°F between day and night. Due to expansion and contraction of all fluids, care should be taken when filling fuel tank and fluid reservoirs to prevent overflow when temperatures change.

(2) Procedures for operating in extreme heat, extreme dust, and mud, sand, and snow also apply to desert conditions.

e. Operate Vehicle in Cold Environment

(1) The 7-ton truck is capable of starting at temperatures down to 10°F with two batteries

(a) If temperatures are expected to be consistently at or below 10°F, it is recommended that two additional batteries be installed.

(2) Fuel Tank

(a) Fuel/water separator should be drained of water before topping off fuel tank

1) Keep fuel tank as full as possible during cold operations

2) Water forms in empty fuel tank as it cools.

3) Water in fuel system could freeze and block fuel system

(3) Turn off all accessories

(4) Turn battery disconnect switch to on position

(5) If engine fails to start in two minutes, turn ignition switch to OFF position. Allow starter to cool at least two minutes before trying again.

(6) Do not turn ENGINE switch to START position while engine is rotating

(7) Check oil pressure gauge, should read in safe range

(a) If OIL PRESSURE gauge does not show appropriate engine oil pressure within 10 to 15 seconds after starting engine, shut engine down immediately – lack of lubrication may damage engine

(8) Run engine until engine idles smoothly

(9) Increase engine speed to 1200 to 1500 rpm or engage high idle switch for another 25 minutes
Operating in temperatures below 0°F, position the CTIS OFF switch in the up or ON position.

Set transmission range selector to third gear.

Position the CTIS OFF switch in the down or off position.

During first five miles of driving operations:

(a) All cornering should be performed slowly and carefully
(b) Slowly drive vehicle to warm up drive line components and tires

Do not use first gear to move vehicle if tires are frozen to ground or brakes are frozen to drums.

Shut off engine as follows:

(a) Set transmission range selector in neutral
(b) Idle engine at 1200 to 1500 rpm until coolant temperature reaches 160°F
(c) Idle engine between 1200 to 1500 rpm for minimum of 10 minutes

Fording Water

(1) Do not ford water unless depth is known. Water deeper than 60 inches may cause personal injury or damage to equipment.
(2) Ensure bottom of fording site is firm enough
(3) Stop MTVR at edge of water.
(4) Prior to fording a water obstacle, ensure engine and transmission dipsticks, and fill caps are properly installed.
(5) Fan ford switch must be activated prior to entering water.
(6) Allow brake drums and shoes to cool before entering water.
(7) Set CTIS controller to appropriate settings. Do not enter water until tires are adjusted to appropriate CTIS setting.
(8) Set transmission range selector to first gear.
(9) Drive MTVR slowly through water.
(10) DO NOT stop in water unless absolutely necessary.

(11) If engine stops, immediately attempt to restart engine

   (a) If engine will not start, tow or winch vehicle from water with another vehicle as soon as possible

(12) Fan ford switch must be turned OFF immediately after leaving water.

(13) Apply light pressure to break pedal, while driving slowly to dry out brake linings.

(14) Apply and release Parking Brake several times to remove water from brake components.

(15) Remove water and clean deposits from vehicle as soon as possible.

(16) If water collected in cab, remove plug from drain hole and allow water to drain. Reinstall plug.

(17) If vehicle comes in contact with salt water, wash with fresh water as soon as possible to minimize corrosion.
A. **Introduction**

This is an OPEN BOOK assignment to be completed per the instructor’s requirements. This assignment is to help familiarize you with the MTVR – U.S. Marine Corps Technical Manual (TM 10629-10A). Do not move on until you completely understand these concepts.

B. **Materials Required**


C. **Study Questions**

1. Prior to operating the CTIS in temperatures below ____ , the CTIS will need to be disabled.
   
   a. 0 degF
   b. 15 degF
   c. 20 degF
   d. 32 degF  
   Page # ______

2. During fording operations, what is the maximum water height a MTVR can ford?
   
   a. 5ft
   b. 6ft
   c. 7ft
   d. 8ft  
   Page # ______

3. What is the turning circle (wall to wall) of the MTVR (MK27/MK28), and what is the Steering Gear Ratio?
   
   a. 98ft / 20:1
   b. 94ft / 18:1
   c. 92ft / 18.1
   d. 96ft / 20:1  
   Page(s) # ______
ASSIGNMENT SHEET 1.7-1
MTVR Operations

4. WARNING – Wheel/tire assembly weighs _____. Do not attempt to lift or catch wheel/tire assembly without the aid of an assistant and suitable lifting device. Failure to comply may result in injury or death to personnel.

   a. 500 lbs
   b. 450 lbs
   c. 400 lbs
   d. 357 lbs

Page # __________

5. In extreme heat conditions, which of the below statement does NOT apply?

   a. Extra care must be taken to prevent overheating engine above 220 degF.
   b. When possible, park so the vehicle faces into the wind.
   c. All fluids, lubricants, and filters should be inspected more frequently and changed as required.
   d. If engine is overheating, allow it to idle for 3 minutes prior to shutdown.

Page # __________

6. When using the ‘Changing Wheel/Tire Assembly’ checklist – Step # 3 states?

   a. Set PARKING BRAKE and shut off vehicle
   b. Position wheel chocks opposite the tire to be changed
   c. Remove CTIS airline form CTIS fitting
   d. Remove three nuts and wheel cover from flat tire assembly

Page # __________

7. When lifting the MTVR, the lifting eyes are designed to support the weight of the vehicle loaded with a cross-country payload of _____?

   a. 14,200 lbs
   b. 18,542 lbs
   c. 22,457 lbs
   d. 38,868 lbs

Page # __________
8. How much ‘total’ fuel can the tank hold?
   a. 70 gal
   b. 76 gal
   c. 80 gal
   d. 85 gal

9. Do not allow the vehicle to coast in N (neutral). This can result in severe transmission damage and unsafe operation.
   a. True
   b. False

10. Do not operate vehicle at more than ____ mph when all differential and transfer case driveline locks are engaged. Failure to comply may result in damage to equipment.
    a. 20
    b. 15
    c. 10
    d. 5
A. Introduction

The following is a test to evaluate your ability to drive the MTVR. During the Highway Road Test the operator must pay close attention to speed, and the CTIS system to ensure the appropriate settings are selected. You will be watched carefully for task performance and competency.

Grading procedures: “POINT VALUE” is the deducted value for that item. “POINTS DEDUCTED” equals the sum of the deduction values multiplied by the number of errors or “INFRACTIONS”. This will be subtracted from 100 total points you have at the beginning of the driver’s test. To pass, you must receive a final score of at least 80.

B. References:

1. USMC TM 10629.10A
2. COMFIRSTNCDISNT 11200.2, Section Five, Operator Testing and Licensing program Implementation

C. Equipment and Materials:

1. MTVR

D. Job Steps:

<table>
<thead>
<tr>
<th>PERFORMANCE ITEM</th>
<th>Point Value</th>
<th>TOTAL NUMBER OF INFRACTIONS</th>
<th>POINTS DEDUCTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Student fails to…)</td>
<td></td>
<td>(Use tally marks for each time the error is made)</td>
<td>(Multiply tally marks by points)</td>
</tr>
</tbody>
</table>

a. MTVR - Highway Operations

Complete Job Sheet 1.5-1:  (instructor sign)  

*VERIFIED/DATE:*

1) Turn battery disconnect switch to “ON” position 1
2) Enter cab using 3 point contact 1
3) Adjust drivers seat and mirrors 1
4) Adjust seatbelt 1
## PERFORMANCE ITEM

(Student fails to…)

<table>
<thead>
<tr>
<th>Point Value</th>
<th>TOTAL NUMBER OF INFRACTIONS (Use tally marks for each time the error is made)</th>
<th>POINTS DEDUCTED (Multiply tally marks by points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5)</td>
<td>Ensure personnel are clear from vehicle and it is safe to start</td>
<td>2</td>
</tr>
<tr>
<td>6)</td>
<td>Ensure the safety of personnel riding in or on MTVR</td>
<td>2</td>
</tr>
<tr>
<td>7)</td>
<td>Ensure load is safe and secure</td>
<td>2</td>
</tr>
<tr>
<td>8)</td>
<td>Ensure parking brake is set</td>
<td>1</td>
</tr>
<tr>
<td>9)</td>
<td>Ensure transmission range selector is in Neutral.</td>
<td>1</td>
</tr>
<tr>
<td>10)</td>
<td>Start MTVR</td>
<td></td>
</tr>
<tr>
<td>11)</td>
<td>Warm up 3 to 5 minutes at 800 to 1000 RPM</td>
<td>2</td>
</tr>
<tr>
<td>12)</td>
<td>Check fuel gauge</td>
<td>1</td>
</tr>
<tr>
<td>13)</td>
<td>Check oil pressure gauge</td>
<td>1</td>
</tr>
</tbody>
</table>
| 14) | Check transmission fluid gauge after warm engine has warmed up  
  - 300deg is overtemp (red light)  
  - 250deg “CHECK TRANS” (yellow light) | 1 |  |
| 15) | Check water (coolant) temp  
  - 205deg fan comes on  
  - 235deg is overtemp (buzzer) | 2 |  |
| 16) | Test air brake system by pushing down and holding brakes for one minute, then release.  
  - note pressure changes within limits | 1 |  |
<p>| 17) | Set CTIS controller to appropriate setting | 2 |  |
| 18) | Reapply service brake and set transmission to desired position. (i.e. “D” “N” “R”) | 1 |  |</p>
<table>
<thead>
<tr>
<th>PERFORMANCE ITEM</th>
<th>Point Value</th>
<th>TOTAL NUMBER OF INFRACTIONS</th>
<th>POINTS DEDUCTED</th>
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</thead>
<tbody>
<tr>
<td>(Student fails to…)</td>
<td></td>
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</tr>
<tr>
<td>19) Release parking brake</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20) Use ground guide if backing up</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21) Check volt gauge</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22) Check gauges periodically to ensure optimum performance</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23) Operate MTVR on approved road course</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>24) Understand local and federal laws regarding commercial type vehicles as well as rules of the road.</td>
<td>2</td>
<td></td>
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<tr>
<td>25) Utilize engine retarder (jake brake) on approved course</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26) ABS brake check on approved course</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Reach speed of 30mph, then apply full brakes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27) Use of mirrors while turning, backing, or changing lanes</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28) Consideration of other drivers while on road course</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29) Use proper signals</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30) Back MTVR to a loading dock (or simulate with cone course).</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31) Make complete stops</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32) Operator remains alert, always checking surroundings</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33) Swings MTVR too wide in turns</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34) Bring MTVR to stop and park</td>
<td>1</td>
<td></td>
<td></td>
</tr>
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</table>
### PERFORMANCE ITEM  
(Students fails to…)

<table>
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<th>POINTS DEDUCTED (Multiply tally marks by points)</th>
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</thead>
<tbody>
<tr>
<td>35) Apply parking brake</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36) Position transmission selector in “N” – Neutral</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37) Align front tires in accordance with parking situation. (hill, unleveled or flat terrain, etc.)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38) Shut down engine brake if activated</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39) Shut off all lights and switches</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40) Cool down engine in Neutral for three minutes between 800 and 1000 RPM</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41) Turn engine ignition switch to OFF</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42) Turn battery disconnect switch to OFF</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>43) Dismount MTVR using 3point contact</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### b. MTVR - Emergency Operations

1) **DESCRIBE** procedures to slave start an MTVR with a dead battery  
   1

2) **DESCRIBE** loss of air system pressure. Simulate if possible.  
   1

3) **DESCRIBE** manual drive-line lock (ONLY USED IN EMERGENCY SITUATIONS)  
   1

4) **DESCRIBE** limp home procedures (follow speed limit guidelines)  
   1

5) **DESCRIBE** procedures for flat tire  
   1

6) **DESCRIBE** other emergency situation(s)  
   

1.7 page 26
### PERFORMANCE ITEM

<table>
<thead>
<tr>
<th>PERFORMANCE ITEM</th>
</tr>
</thead>
<tbody>
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<td><strong>(Student fails to...)</strong></td>
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<tbody>
<tr>
<td>7) After Off-road operations, select appropriate CTIS setting and follow parking and shutdown procedures.</td>
<td>2</td>
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<tr>
<td><strong>c. Post Driving Procedures</strong></td>
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</tr>
<tr>
<td>1) Perform IAW Job Sheet Job Sheet 1.6-3</td>
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1.7 page 27
A. Introduction

The following is a test to evaluate your ability to drive the MTVR in Off Road scenarios. The operator must pay close attention to speed, and the CTIS system to ensure the appropriate settings are selected. You will be watched carefully for task performance and competency.

Grading procedures: “VALUE OF ITEM” is the deducted value for that item. “TOTAL POINTS DEDUCTED” equals the sum of the deduction values multiplied by the number of errors. This will be subtracted from 100 total points you have at the beginning of the driver’s test. To pass, you must receive a final score of at least 80.

B. References

1. MTVR student handbook and USMC TM 10629.10A

C. Equipment and Materials

1. MTVR

D. Job Steps

<table>
<thead>
<tr>
<th>PERFORMANCE ITEM</th>
<th>Point Value</th>
<th>TOTAL NUMBER OF INFRACTIONS</th>
<th>POINTS DEDUCTED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(Use tally marks for each time the error is made)</td>
<td>(Multiply tally marks by points)</td>
</tr>
</tbody>
</table>

a. MTVR - Off Road Operations

Complete Job Sheet 1.7-2:  

VERIFIED/DATE:

1) Activate CTIS for terrain and load setting  

2) Maintain constant slow speed when MSS is selected for the terrain setting  

3) Do not spin wheels when beginning to move vehicle  

4) Do not change controller or driveline lock settings while vehicle is turning or wheels are slipping.
### PERFORMANCE ITEM

<table>
<thead>
<tr>
<th>PERFORMANCE ITEM</th>
<th>Point Value</th>
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<tbody>
<tr>
<td><strong>TOTAL NUMBER OF INFRACTIONS</strong> (Use tally marks for each time the error is made)</td>
<td></td>
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<tr>
<td><strong>POINTS DEDUCTED</strong> (Multiply tally marks by points)</td>
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</tbody>
</table>

#### b. Vehicle adjustments for Off-road

1) Mud flaps need to be pinned on storage hooks located on mud flaps  
   2) Adjust under ride bar  
   3) Select appropriate transmission range and gear selection  
   4) Navigate approved off-road course varying between CC- Cross Country and MSS- Mud, Sand, Snow  
   5) Operator planned route prior to departing for off-road conditions  
   6) Operator allotted adequate time and maintained appropriate speed while selecting different CTIS terrain setting  
   7) Operator periodically checking instrument gauges

#### c. Steep Grades

1) Greater than 25% grade initial setting should be CC, if wheels slip adjust CTIS to MSS  
   2) Proper use of gears  
   3) If wheels slip while in MSS, switch to EMER  
   4) Once grade is crested, adjust transmission range and CTIS setting

#### d. Driving down steep grades

- Check if not available during initial training
## JOB SHEET 1.7-3
### MTVR OFF ROAD OPERATIONS

<table>
<thead>
<tr>
<th>PERFORMANCE ITEM</th>
<th>Point Value</th>
<th>TOTAL NUMBER OF INFRACTIONS</th>
<th>POINTS DEDUCTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Do not allow engine speed to go over 2100 RPM</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>2) Apply service brake as required. Closely monitor air pressure gauges</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Use engine brake/retarder as required.</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Accelerate, brake, and steer as required.</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Maximum traction under adverse off-road conditions</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Post Driving Procedures

Perform IAW Job Sheet Job Sheet 1.6-3
A. Introduction

During this lesson you will learn key points of the self-recovery winch.

B. Enabling Objectives

2.1 **DESCRIBE** the MTVR self-recovery winch in accordance with USMC TM 10629.10A.

2.2 **OPERATE** the MTVR self-recovery winch in accordance with USMC TM 10629.10A.

C. Topic Outline

1. Self-Recovery Winch System (SRW)
   a. General
      (1) Designed to allow a 7-Ton truck to recover itself or another vehicle from mired conditions.
      (2) Can only be winched from rear position.
      (3) Assistance is required for operation of Self-Recovery Winch (SRW).
   b. Winching Methods
      (1) Winched Cable Method - Leaving vehicle being winched attached to cable until winched vehicle is 15 to 20 ft. from winch
      (2) Loose Cable Method - Hooking cable to immovable object; winch cable while backing up vehicle until clevis is approximately 15 to 20 ft. from winch
   c. Winch Safety – Warnings and Cautions
      (1) Warnings
         (a) Never pull load from the manual winch IN/OUT lever. Winch cable may snap and hit operator during winch operations. Failure to comply may result in injury or death to personnel.
         (b) All personnel must stand clear of winch cable during winch operation. Snapped winch cable can cause injury or death
         (c) Do not disengage winch under load. Failure to comply may result in injury or death to personnel.
(d) Winch is NOT to be used for lifting or moving of persons. Failure to comply may result in injury or death to personnel.

(e) Winch components become hot during normal operation. Use care when operating winch. Failure to comply may result in injury to personnel.

(2) Cautions

(a) When using the SRW, the cable should be as straight behind the vehicle as possible

1) When the cable deviates more than 30° from being straight behind the vehicle, the efficiency of the winch in degraded.

(b) Do not use the SRW, if during a winching operation the cable comes into contact with a vehicle component other than the rollers in the rear roller guide.

d. Preparation for Use.

(1) Start Engine

(2) Park directly facing away from object to be winched.

(3) Position transmission selector in “N” – Neutral.

(4) Apply parking brake.

e. Unwinding Winch Cable

(1) Adjust right side mirror until assistance can be seen at rear of vehicle.

(2) Push mode button on transmission range selector

(3) Push winch ON/OFF switch (in cab) to ON.

(4) Push high idle switch (in cab) to ON
(5) Ensure shift lever is in ENGAGE position

(a) Do not force shift level into position. If shift lever does not engage/disengage, rock winch drum as required until shift lever engages. Failure to comply may result in damage to equipment.

(6) Move manual Winch In/Out lever to pay out small amount of cable

(7) Release manual winch IN/OUT lever.

(a) Warning

1) Always wear heavy leather gloves when handling winch cable. Never let cable run through hands. Broken cable wires will cause injury to personnel.
(8) Remove cotter pin and clevis pin from clevis

(a) Shift lever may be positioned in DISENAGE position to pull cable by hand (free spool). Once enough cable has been payed out, position shift lever to ENGAGE position.

(9) Use manual winch IN/OUT lever or free spooling of winch to pay out required amount of cable required to reach rear of vehicle.

(10) Release winch IN/OUT lever.

(11) Thread winch cable out through rear roller guide, past first vertical roller and then between two horizontal rollers and two vertical rollers.

(a) Do not position cable between tensioning pulley until cable is routed completed through rear roller guide.
(12) Use winch IN/OUT lever or free spooling of winch to pay out cable until cable reaches vehicle to be pulled or anchor point.

(13) Release winch IN/OUT lever.
f. Cable Safety

(1) Check cable for broken wires and kinks.

(a) Cable is not fully mission capable if:

1) Cable has more than three broken wires per inch on same strand

2) Cable has more than six broken wires on all stands in one inch of cable. Maximum number of broken wires shall not occur in any two consecutive inches of cable.

(b) Warnings

(1) Never winch a load with less than five wraps of cable on winch drum. Failure to comply may result in injury or death.

   a) There must always be at least five wraps of cable on winch. If load is applied with less than five wraps of cable on winch, cable may come loose on drum.

(2) Avoid quick, jerking winch operation. Keep all personnel well away from vehicle involved in winching operation. Snapped cable of shifting load may cause serious injury or death.
(3) Never pull load from the manual winch IN/OUT lever. Winch cable may snap and hit operator during winch operations. Failure to comply may result in injury or death to personnel.

g. Procedures for Self-Recover

(1) STEP 1

(a) Attach cable to anchor point object.

1) Ensure anchor point object is strong enough to withstand pull of winch. Failure to comply may result in injury or death.

2) Winch cable must never be looped around an anchor point object and secured to itself. Failure to comply may result in damage to winch cable.

3) Cable must be positioned and attached to an anchor point object, as straight as possible behind the vehicle. Failure to comply may result in damage to equipment.

4) A single hook winch chain is used to assist in recovery operations where applicable. The chain is stored in vehicle stowage box.

5) If anchor point object is another vehicle, attach cable directly to shackles, tow rings or pintle hook of anchor vehicle.
6) If anchor point object is a tree, rock, or other stationary or heavy object, attached winch chain to anchor point object to facilitate cable attachment.

![Anchor Point Object Diagram]

(2) STEP 2
(a) If vehicle is heavily or deeply mired, attach snatch block.

1) Mechanical Advantage Use of Snatch Block
   a) With the use of the snatch block this creates a 2:1 ratio mechanical advantage
   b) The SAFE WORKING LOAD of 5/8” wire rope is rated to 11,000lbs. Breaking strength of 5/8” wire rope is approximately 35,000lbs.
   c) In a single part line 5/8” wire rope can only be rated to 11,000lbs capacity.
   d) With the use of the snatch block makes the 5/8” wire rope into two part line increasing its capacity from 11,000lbs to 22,000lbs.

2) Safety Notes
   a) Snatch block use increases capacity of the wire rope to 22,000lbs safe working load.

1) WINCH RATING IS 20,000lb CAPACITY
b) When attaching snatch block to a truck, anchor point object, or winch chain, ensure open side of hook faces up. Failure to comply may result in severe injury or death to personnel.

3) To install snatch block

a) Pay out enough cable to reach anchor point object and back to vehicle

b) Attach winch cable to vehicle

c) Attach snatch block to cable

1) Unscrew pin and partially pull away from snatch block

2) Move plate to side and open snatch block

3) Position cable in snatch block

4) Close plate and align holes on snatch block. Tighten pin and ensure cable can move freely through snatch block.
5) Attach snatch block to anchor point object

(3) STEP 3 - From this point two personnel are required to operate winch
   
   (a) Turn off high idle switch.

(4) STEP 4
   
   (a) Set CTIS to EMERGENCY position
   
   (b) Set transmission range selector to “R” - reverse

(5) STEP 5
   
   (a) Release parking brake.
(6) STEP 6

(a) Release service brake pedal.

1) Engine RPM in excess of 1550 RPM will disable winch (PTO)

(7) STEP 7

(a) Push and hold winch IN/OUT switch to IN position and apply slight pressure to throttle pedal.

1) Keep cable tight at all times to ensure cable does not get tangled with vehicle

2) If winch does not move vehicle, stop using winch. Failure to comply may result in damage to vehicle.

(8) STEP 8

(a) When anchor point is 15 to 20 ft. from rear of vehicle, release winch IN/OUT switch to stop winding.

(9) STEP 9

(a) Apply parking brake.

(10) STEP 10

(a) Set transmission range selector to “N” - neutral.

(11) STEP 11

(a) Push and hold winch IN/OUT switch to OUT position and pay out cable until all tension is off cable

(12) STEP 12

(a) When all tension is off of cable, release winch IN/OUT switch.

(13) STEP 13

(a) Remove snatch block.

1) Ensure there is slack in cable

2) Unscrew pin and partially pull away from snatch block
3) Move plate to side and open snatch block

4) Remove cable from snatch block

5) Close plate and align holes in snatch block. Tighten pin and return snatch block to stowage.

STEP 14

(a) Disconnect and stow cable
h. Eight Steps of RECOVERY

Reconnoiter area
Estimate situation
Calculate ratio
Obtain resistance
Verify solution
Erect rigging
Recheck rigging
You are ready

i. MTVR Brakes
(1) Application of brake pedal will deactivate winch PTO and high idle (1500 rpm) setting.

j. Winch Safety
(1) Never step over cable when laid out or with tension applied

(2) Always ensure operator and ground guide understand hand signals and understand each other

(3) Never assume winching area is clear. Check and recheck

(4) Never attempt to speed up a recovery operation
A. Introduction

This is an OPEN BOOK assignment to be completed per the instructor’s requirements. This assignment is to help familiarize you with the MTVR self recovery winch. Do not move on until you completely understand these concepts.

B. Materials Required


C. Study Questions

1. ____ personnel are required to operate the winch?
   a. One
   b. Two
   c. Three
   d. Four

2. Which of the following is NOT a “WARNING” associated with the MTVR self recovery winch?
   a. All personnel must stand clear of winch cable during winch operations
   b. Always wear heavy leather gloves when handling winch cable
   c. Tension must be maintained on winch during rewinding operations.
   d. Winch is NOT to be used for lifting or moving of persons.

3. Tension must be maintained by winching vehicle until vehicle is ____ from anchor point?
   a. 10-15 ft
   b. 5-10 ft
   c. 20-25 ft
   d. 15-20 ft.
ASSIGNMENT SHEET 2.1-1
Winch Operations

4. If winch does not move vehicle, stop using winch. Failure to comply may result in damage to equipment. This statement is a ________?
   a. Warning
   b. Caution
   c. Note
   d. None of the above

Page # ________

5. When attaching snatch block to a truck, anchor point, or winch chain, ensure open side of hook faces down. Failure to comply may result in severe injury or death to personnel.
   a. True
   b. False

Page # ________

6. How long is the wire rope on the SRW (MK25 and MK28)?
   a. 200ft
   b. 225ft
   c. 250ft
   d. 275ft

Page # ________

7. With only five wraps left on the drum, how much wire rope is left ____?
   a. 20ft
   b. 25ft
   c. 30ft
   d. 35ft

Page # ________

8. Cable is not fully mission capable if: Cable has more than _____ broken wires per inch on the same strand, or cable has more than _____ broken wires on all strands in one inch of cable?
   a. 4 / 6
   b. 3 / 6
   c. 6 / 5
   d. 3 / 5

Page # ________
A. Introduction

This job sheet will evaluate your ability to properly utilize the MTVR winch in a self-recovery operation. Assignment sheet 2.1-1 must be complete prior to conducting the requirements on the job sheet. Safety is paramount during all evolutions of self-recovery. You will be required to describe the basic function of each component of the winch you are checking, and then safely demonstrate its use during a simulated self-recovery. This is a pass/fail test.

This is a training opportunity - Do not continue without fully understanding each step.

B. References

1. USMC TM 10629.10A

C. Job Steps for MTVR Self-Recovery Winch System (SRW) operations

Note: This checklist is for training only, in the fleet you will use the US. Marine Corps Technical Manual listed above in Ref B-1.

<table>
<thead>
<tr>
<th>1. Self-Recovery Preparation</th>
<th>Check</th>
<th>Verified</th>
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<tbody>
<tr>
<td><strong>NOTE:</strong> THIS PROCEDURE IS FOR ONE MTVR IN A SELF-RECOVERY TRAINING EVALUATION ONLY</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>WARNINGS, CAUTIONS &amp; NOTES:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refer to: USMC TM 10629.10A, pages 2-181 to 2-208</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Select suitable anchor point</td>
<td></td>
<td></td>
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<tr>
<td>b. Start Engine</td>
<td></td>
<td></td>
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<tr>
<td>c. Park facing away from a suitable anchor point</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Set transmission range selector to $N$ (Neutral)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Apply parking brake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Adjust right side mirror until safety observer can clearly be seen at rear of vehicle.</td>
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</tbody>
</table>
### MTVR SELF-RECOVERY WINCH

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>g.</td>
<td>Push MODE button on transmission range selector.</td>
</tr>
<tr>
<td>h.</td>
<td>Push WINCH ON/OFF switch (in cab) to ON.</td>
</tr>
<tr>
<td>i.</td>
<td>Ensure shift lever is in ENGAGE position.</td>
</tr>
<tr>
<td>j.</td>
<td>Move manual WINCH IN/OUT lever to pay out 2-3 ft of cable.</td>
</tr>
<tr>
<td>l.</td>
<td>Remove cotter pin and clevis pin from clevis.</td>
</tr>
<tr>
<td>m.</td>
<td>Use manual WINCH IN/OUT lever or free spooling of winch to pay out cable 2 ft past rear of vehicle.</td>
</tr>
<tr>
<td>n.</td>
<td>Release WINCH IN/OUT lever.</td>
</tr>
<tr>
<td>o.</td>
<td>Thread winch cable out through rear roller guide, between two horizontal rollers and to vertical rollers.</td>
</tr>
<tr>
<td>p.</td>
<td>Use WINCH IN/OUT lever or use free spooling of winch to pay out cable 4 foot past anchor point.</td>
</tr>
<tr>
<td>q.</td>
<td>Release winch IN/OUT lever.</td>
</tr>
<tr>
<td>r.</td>
<td>Attach clevis to anchor using shackle.</td>
</tr>
<tr>
<td>s.</td>
<td>(With Gloves) Check cable for broken wires and kinks. If found (or questionable), notify Second Echelon Maintenance.</td>
</tr>
<tr>
<td>t.</td>
<td>Check for at least 5 wraps of cable left on winch. If less than five stop operations and notify Second Echelon Maintenance.</td>
</tr>
<tr>
<td>u.</td>
<td>Describe/demonstrate using the Snatch Block</td>
</tr>
<tr>
<td>1)</td>
<td>Remove snatch block from storage.</td>
</tr>
<tr>
<td>2)</td>
<td>Unscrew pin (hook side) and partially pull away from snatch block.</td>
</tr>
<tr>
<td>3)</td>
<td>Move plate to side to open snatch block.</td>
</tr>
</tbody>
</table>
MTVR SELF-RECOVERY WINCH

4) Position cable in snatch block

5) Close plate and align holes on snatch block

6) Tighten pin in snatch block

7) Ensure screw is tight and cable can move freely through the snatch block.

8) Attach snatch block to anchor point (chain preferred)

9) If required - Pay out enough cable to reach back to vehicle.

10) Attach winch cable to vehicle.

2. Self-Recovery in-cab procedures

SAFETY REMINDER: Remain well clear of payed out cable while under tension (1 ½ time the length of payed out cable)

   a. Turn on HIGH IDLE switch

   b. Release parking brake.

      NOTE: Ensure tension is applied to cable before releasing brake

   c. Release service brake pedal - DO NOT allow engine RPM to exceed 1550 RPM.

   d. Push and hold WINCH IN/OUT switch to IN position.

   e. When MTVR has pulled itself within 15 to 20 feet of the anchor point, release winch IN/OUT switch to stop winding.

   f. Re-apply parking brake

   g. Push and hold WINCH IN/OUT switch to OUT position and pay out cable until all tension is off cable.

   h. When all tension is off cable, release WINCH IN/OUT switch.
i. Turn HIGH IDLE switch to OFF.

### 3. Procedures for Disconnecting and Stowing Cable

<table>
<thead>
<tr>
<th></th>
<th>Check</th>
<th>Verified</th>
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<tbody>
<tr>
<td>a.</td>
<td>Disconnect cable by removing cotter pin, clevis pin, and clevis from vehicle.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>With the aid of an assistant, use manual control lever to return cable to winch. STOP at two feet from roller guide.</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>Release manual control lever.</td>
<td></td>
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<tr>
<td>d.</td>
<td>(With gloves) Remove cable from rear roller guide by manually pulling cable through horizontal rollers and vertical roller system.</td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>Reinstall clevis pin and cotter pin on clevis.</td>
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</tr>
<tr>
<td>f.</td>
<td>With the aid of an assistant, using manual control lever continue winding cable until clevis pin is approximately 10 inches from cable hold down, then release manual control lever.</td>
<td></td>
</tr>
<tr>
<td>g.</td>
<td>Turn WINCH ON/OFF switch to OFF position.</td>
<td></td>
</tr>
<tr>
<td>h.</td>
<td>Turn MODE switch (in cab) to OFF position.</td>
<td></td>
</tr>
<tr>
<td>i.</td>
<td>Turn high idle switch (in cab) to OFF position.</td>
<td></td>
</tr>
<tr>
<td>j.</td>
<td>Shut off engine.</td>
<td></td>
</tr>
</tbody>
</table>
A. Introduction

This job sheet will evaluate your ability to properly utilize the MTVR Dump Truck. Safety is paramount during all evolutions of the Dump Truck operations. You will be required to describe the basic function of each component of the Dump Truck you are checking, and then safely demonstrate its use during a simulated dump operation. This is a pass/fail test.

This is a training opportunity - Do not continue without fully understanding each step.

B. References

1. USMC TM 10629.10A

C. Job Steps for MTVR Dump Truck operations

   Note: This checklist is for training only, in the fleet you will use the US. Marine Corps Technical Manual listed above in Ref B-1.

<table>
<thead>
<tr>
<th></th>
<th>Check</th>
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<tbody>
<tr>
<td>1. Procedures for Raising the Dump Bed</td>
<td></td>
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</tbody>
</table>

**NOTE:** THIS PROCEDURE IS FOR ONE MTVR IN A DUMP TRUCK TRAINING EVALUATION ONLY

Refer to:

   a. Start Engine

   b. Set transmission range selector to N (Neutral)

   c. Apply parking brake

   d. Ensure travel lock is in the dump position (next to battery box)

   e. Adjust safety chains to desired length

   f. Adjust side mirrors until safety observer can clearly be seen at rear of vehicle.

**SAFETY REMINDER:** Ensure area to be dumped is clear of personnel and overhead lines
g. Push MODE button on transmission range selector. This will activate Power Takeoff (PTO).

h. Push Tailgate Release switch to the right to unlock tailgate.

i. Pull Dump Body Lever up and back to raise dump body (do not exceed 1550 RPM).

**NOTE:** Lever is center spring loaded so lever will always return to center (neutral) position when released

j. Have observer set up body props under dump (used for service only).

k. Push Dump Body Lever forward and down to lower dump body onto body props.

l. Inspect dump body, ram and all hoist components for damage.

2. Procedures for Stowing Dump Bed

a. Pull Dump Body Lever up and back to raise dump body off of body props.

b. Have observer stow body props under dump.

c. Push Dump Body Lever forward and down to lower dump body into the stowed position.

d. Have observer check safety chains and clear tailgate.

e. Push Tailgate Release switch to the left to lock tailgate.

f. Push MODE button on transmission range selector. This will deactivate Power Takeoff (PTO)

g. Pull Tarp Brake Lever down partially, tarp will immediately spring to the rear, pulling lever down further will apply “brake” to tarp deployment.

h. Crank Tarp Crank Handle to return tarp back to the stowed position

i. Turn off engine.
A. Introduction

During this lesson you will learn about the load capabilities for the MTVR and the ISO (International Organization for Standardization) locks used.

B. Enabling Objectives

3.1 **DESCRIBE** the load capabilities of the MTVR, in accordance with USMC TM 10629.10A

C. Topic Outline

1. ISO Bed and ISO Locks
   
   a. ISO Bed
      
      (1) Locations on MK27/MK28 – Extended Wheel Base
         
         (a) 8 pairs of lock location
b. ISO Locks

(1) Standard ISO Lock/Unlock

(a) Lock

1) Pull back pin and loosen nut completely
2) Push ISO lock up through ISO bed
3) Turn ISO lock ¼ turn so handle points away from ISO bed
4) Allow ISO lock to drop down into seated position in ISO bed
5) Load containers on ISO bed ensuring alignment with ISO locks
6) Turn ISO lock ¼ turn to locked position until handle is pointed in same direction as in Step 1
   a) To prevent nut from turning when pin is released, ensure pin rests in notch of nut. Failure to comply could result in damage to equipment.
7) Pull back pin and tighten nut securely.

(b) Unlock

1) Pull back pin and loosen nut
2) Turn ISO lock ¼ turn so handle points away from ISO bed
3) Unload containers
4) Push on ISO lock and turn ¼ turn so handle is pointing in same direction as in Step 1.
5) Lower ISO lock and allow ISO lock to recess into ISO bed
   a) To prevent nut from turning when pin is released, ensure pin rests in notch of nut. Failure to comply could result in damage to equipment.
6) Pull back pin and tighten nut securely.

(c) Positions of Standard ISO Locks

1) Container Load/Unload Position

2) Container Lock
3) Storage Position

(2) Shallow ISO Lock

(a) NOTE: The ISO lock spanner wrench may need to be used to loosen ISO lock knob

(b) Lock

1) Loosen ISO Lock knob and turn counterclockwise (when view is from below ISO lock), until end of travel is reached

2) Push ISO lock knob up through ISO bed, turn $\frac{1}{4}$ turn and position ISO lock parallel to side of ISO bed

3) With square end of ISO lock spanner wrench inserted in shaft, turn $\frac{1}{4}$ turn

4) Load containers on ISO bed and ensure proper alignment is made with ISO locks
LESSON TOPIC 3.1 Load Capabilities

5) Insert square end of ISO lock spanner wrench in shaft and turn shaft ¼ turn

6) Turn ISO lock knob clockwise until seated and tighten with ISO lock spanner wrench.

(c) Unlock

1) Pull and turn lock pin ¼ turn counterclockwise

2) Loosen ISO lock with ISO lock spanner wrench and turn knob counterclockwise (when view is from below ISO lock) until end of travel is reached

3) Insert square end of ISO lock spanner wrench in shaft and turn ¼ turn.

4) Remove containers from ISO bed

5) Push ISO lock knob up and turn ISO lock ¼ turn

6) Lower ISO lock and allow ISO lock to recess into ISO bed

7) Insert square end of ISO lock spanner wrench in shaft, turn ¼ turn and allow ISO lock to fully recess into ISO bed.

8) Turn ISO lock knob clockwise until seated and tighten

9) Pull and turn lock pin clockwise ¼ turn.

2. MTVR Load Capability

a. Payload

(1) The vehicle is capable of carrying:

(a) 7.1 tons off road

(b) 15 tons on road

(2) Payload center of gravity shall be placed at the approximate center of useable cargo area.

(3) Prior to loading cargo, operator must determine the type of payload using Table 2-12, the weights of different containers, using Table 2-13 and the use and possible changes in the containers. Operators must also be familiar with load limiting factors listed in Table 2-14.
(a) Payload Weight Variations (See table 2-13)

<table>
<thead>
<tr>
<th>Type of Load</th>
<th>Weight Range Each (lbs/ kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distributed Palletized</td>
<td>30 lbs to 15 tons (14 - 13,608 kg)</td>
</tr>
<tr>
<td>6-Con, General</td>
<td>2,530 lbs to 5 tons (1,148 - 4,536 kg)</td>
</tr>
<tr>
<td>6-Con, Water Tank</td>
<td>2,530 lbs to 9,730 lbs (1,148 - 4,413 kg)</td>
</tr>
<tr>
<td>6-Con, Water Pump</td>
<td>3,000 lbs (1,361 kg)</td>
</tr>
<tr>
<td>6-Con, Fuel Tank</td>
<td>2,530 to 8,830 lbs (1,148 - 4,005 kg)</td>
</tr>
<tr>
<td>6-Con, Fuel Pump</td>
<td>4,000 lbs (1,814 kg)</td>
</tr>
<tr>
<td>10 ft. (3m) Shelter</td>
<td>2,950 lbs to 7,500 lbs (1,338 - 3,402 kg)</td>
</tr>
<tr>
<td>Quad Cons</td>
<td>1,800 lbs to 10,000 lbs (816 to 4,536 kg)</td>
</tr>
<tr>
<td>20 ft. (6m) Container</td>
<td>4,700 lbs to 30,000 lbs (2,132 - 13,608 kg)</td>
</tr>
<tr>
<td>20 ft. (6m) Shelter</td>
<td>4,650 to 15,000 lbs (2,109 - 6,804 kg)</td>
</tr>
</tbody>
</table>

b. Load Limiting Factors

(1) Axle Loading – Front axle load range is 11,000 lbs to 16,000 lbs for optimum ride quality and steering and handling. Too much weight on front axle will cause excessive stress on front suspension, too little weight on front axle will cause possible loss of steering control.

(2) Terrain Requirements – Payload limited to:

(a) 7.1 tons off road

(b) 15 tons on road

(3) Shipping Requirements – Payload limited to 7.1 tons for rail shipping and crane loading

(4) Federal Highway Regulations – Payloads limited to 15,920 lbs for MK27 and MK 28.
c. Loading Cargo/Container Placements

(1) When loading or unloading any of the container combination listed below, the payload may require the operator to rearrange the cargo in order to meet the loading restrictions specified.

(2) The payload configuration must fall within the guidelines prior to movement.

(3) 20 ft. Shelter/Container

   (a) Vehicle is capable of carrying one 20 foot container

   (b) Prior to loading adjust the interior materials/components so that the center of gravity is close to the center of the shelter/container.

   (c) Secure the shelter/container using ISO locks #1 and #8

(4) 10 ft. Container(s)

   (a) Vehicle is capable of carrying one or two containers

   (b) Total combination weight of 7.1 tons off road or 7.5 tons on road

   (c) Secure containers as follows:
1) One container – must be placed in forwarded position. Use ISO locks #1 and #4.

2) Two containers – heavier container must be placed in the forward position (ISO Locks #1 and #4); the lighter in the rear position (ISO Locks #5 and #8)

(5) Six-Cons

(a) Vehicle is capable of carrying one, two or three six-con units

(b) Total combine weight of 7.1 tons off road and 15 tons on road

(c) Secure containers as follows:

1) One six-con – container must be placed in the middle position. Use ISO locks #3 and #5)
2) Two six-con – the heavier container must be placed in the forward position (use ISO locks #1 and #2). The other must be placed in the rear position (use ISO locks #7 and #8. Payload separated.

![Diagram of a truck with a tank and a pump, with locks labeled 1 & 2, 7 & 8.]

a) If the vehicle is loaded with two water or fuel tank six-cons, liquid should be dispensed from the rear container first until empty and then from the forward container.

[1] When replenishing the empty tanks, the forward tanks should be filled first and then the rear tank

b) If carrying one six-con water or fuel tank, and one six-con of water or fuel pump, the units may be carried in pairs under the following restrictions:

[1] The pump unit shall be place in the front position (use ISO locks #1 and #2)

[2] The tank unit shall be placed in the middle position (use ISO locks #3 and #6)

![Diagram of a truck with a pump and a tank, with locks labeled 1 & 2, 3 & 6.]

3.1 page 9
3) Three six-cons – the heavier container must be placed in the forward position (use ISO locks #1 and #2) and middle position (use ISO locks #3 and #6) and the third must be placed in the rear position (use ISO locks #7 and #8)

   a) If carrying two six-con water or fuel tanks and one six-con water or fuel pump, the pump unit shall be placed in the middle position (use ISO locks #3 and #6), the tanks units shall be placed in the forward position (use ISO locks #1 and #2) and rear positions (ISO locks #7 and #8)

   b) Dispense liquid from the rear container first until empty and then from the front container.

   c) When replenishing the empty tanks, the forward tank should be filled first.

   ![Diagram of truck with three tanks and pump]

   Locks 1 & 2 3 & 6 7 & 8

   ![Diagram of truck with three tanks and pump]

   Locks 1 & 2 3 & 6 7 & 8
(6) Quad-Cons

(a) Vehicle is capable of carrying two or four units

(b) Total combination weight of 7.1 tons off road and 15 tons on road.

(c) Units shall be coupled together in pairs after loading

(d) Secure one pair of quad-con using ISO locks #1 and #4; the other with ISO locks #5 and #8

(e) If carrying one quad-con off road, the pair must be equally loaded.

(f) If carrying one quad-con pair, the pair must be secured in the following manner (One quad-con pair cannot be secured using four ISO locks):

1) Place container pair so that the rear ISO lock pockets on the pair are positioned over ISO lock #7. The front ISO lock pockets of the pair will be just forward of ISO lock #2.

2) Secure the #7 ISO locks to the ISO lock casting of the container

3) Connect the two quad-cons together

4) Tie the front of the container pair to the cargo body with chain/cable tiedowns
(7) WARNING – Wrong Container Placement

1) Pump not in correct position with tanks

2) One container not in correct position
3) Quad-Con not in correct position and secured properly
A. Introduction

During this lesson you will learn the procedures for preparing the MTVR for embarkation.

B. Enabling Objectives

3.2 **DESCRIBE** the procedures for reducing the MTVR vehicle height for shipment in accordance with USMC TM 10629.10A

3.3 **PREPARE** the MTVR for shipment in accordance with USMC TM 10629.10A.

C. Topic Outline

1. Embarkation
   
      
      (1) When preparing the vehicle for transport refer to the TM located in the vehicle for step by step instructions
      
      (a) Step by step procedures are listed in the TM Manual under Appendix F paragraph F-7
      
      (b) Configuration the MTVR for rail and ship transport. Specific configurations are also listed for the various aircraft transport.

2. Preparing Vehicle
   
   a. Reduce Vehicle Height
      
      (1) All items removed to achieve the reduced height can be removed using on-board Basic Issue Items (BII) tools in approximately 30 minutes
      
      (2) The 7-Ton cargo truck may be operated with the vehicle in the reduced height configuration to facilitate loading the vehicle into transport platform
      
      (3) Must be configured to reduced height for:

      (a) Marine transport
      
      (b) Rail transport within NATO countries and Korea
      
      (c) Air transport by C-130 and C-141
      
      (d) Tractors using M870 semi-trailer

3.2 page 1
b. Shipment Preparation

(1) This procedure requires two personnel.

(2) Tools required from BII

   (a) Adjustable wrench

   (b) Allen wrench

   (c) Pliers

(3) Prior to performing this task, the machine gun mount must be removed and stowed as required.

(4) The cargo body cover, bows, staves and backrest must be removed and stowed in cab, cargo body or stowage box.
c. Seat Adjustment

(1) Position air seat to lowest position using height adjustment switch

(2) Adjust three seat belt columns to lowest position by removing clip. After seatbelt columns are lowered, install clip.

d. Air Intake Stack

(1) Loosen clamp 1 on air intake stack and hump hose

(2) Remove two locknuts and screws from clamp 2 and bracket

(3) Remove air intake stack, clamp 1 and clamp 2 from hump hose

(4) Reinstall two screws and locknuts on clamp 2

(5) Loosen clamp 3 on air intake stack and air intake cap

(6) Remove air intake cap and clamp 3 from air intake stack. Store air intake stack in cargo body.

(7) Position clamp 1 on hump hose

(8) Install air intake adapter in hump hose and secure with clamp 1

(9) Position clamp 2 on air intake adapter

(10) Install air intake cap on air intake adapter and secure with clamp 2
e. Wiper Arm Assemble

(1) Remove washer hose from fitting
(2) Raise wiper arm
(3) Press lever and remove wiper arm from shaft
(4) Repeat Steps for other wiper arm

f. Cab Unit

(1) Turn four allen screws counterclockwise approximately 180° in four latches to release rear wall

(a) NOTE: Roof will need to be raised approximately one foot to allow rear wall to be folded in.
(2) Fold rear wall inside cab and latch rear wall to cab ceiling with two latches

(3) Remove cable ties from latches

(a) NOTE: For removal of cable ties, contact Second Echelon Maintenance
(4) Release two latches in upper front corners of cab

(5) With the aid of an assistant, lift cab roof and slide forward until cab roof is positioned over hood

(6) Roll down cab door windows

(7) Release two latches (latch 1) on cab doors and fold top of doors down

(8) Release two latches (latch 2)
LESSON TOPIC 3-2 Preparation for Embark

(9) Lower cab side down 90° and remove tracks. Store cab side walls inside cargo body

(a) WARNING: When lowering cab side walls, walls will become detached from cab. Remove with care to prevent damage to equipment and possible injury to personnel

(10) Pull mirror assemblies downward. Rotate mirrors 180° until mirrors face inward

(11) If ladder is mounted on tailgate, remove and attach ladder to side of cargo bed

g. Muffler and Exhaust Stack

(1) Remove clamp and exhaust stack from muffler

(2) Install clamp on muffler

(3) Install rain cap in exhaust part of muffler

(4) Attach loose end of tether to muffler tab

3. Raising Vehicle Height After Transport

a. Follow procedures for “Lowering Vehicle for Transport” in the reverse order

b. Observe all safety measures
A. Introduction

This job sheet will evaluate your ability to correctly prepare the MTVR for embark in teams of two. Following the provided guidelines and steps, the team should be able to accomplish this task within 30-minutes. Safety is paramount during this evolution; observe all warnings, cautions and notes in accordance with the USMC 10629.10A Technical Manual. This is a pass/fail test.

This is a training opportunity - Do not continue without fully understanding each step.

B. References

1. USMC TM 10629.10A

C. Job Steps for Preparing the MTVR for shipment / embark.

Note: This checklist is for training only, in the fleet you will use the US. Marine Corps Technical Manual listed above in Ref B-1.

<table>
<thead>
<tr>
<th></th>
<th>PASS</th>
<th>FAIL</th>
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<tbody>
<tr>
<td>1. Shipment Preparation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Auxiliary items</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Ensure machine gun mount is removed and stowed as required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Ensure cargo body cover, bows, staves, and backrests are removed and stowed as required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note: CTIS setting may be required in actual embark events</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Seat Adjustment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Position air seat to lowest position using height adjustment switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Adjust three seatbelt columns to lowest position and secure them</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Preparing for Embark

**c. Air Intake Stack**

1. Loosen clamp 1 on air intake stack and hump hose.
2. Remove two locknuts and screws from clamp 2 and bracket.
3. Remove air intake stack, clamp 1 and clamp 2 from hump hose.
4. Reinstall two screws and locknuts on clamp 2.
(5) Loosen clamp 3 on air intake stack and air intake cap.

(6) Remove air intake cap and clamp 3 from air intake stack. Store air intake stack in cargo body.

(7) Position clamp 1 on hump hose.

(8) Install air intake adapter in hump hose and secure with clamp 1.

(9) Position clamp 2 on air intake adapter.

(10) Install air intake cap on air intake adapter and secure with clamp 2.

d. Windshield Wipers
## PREPARATION FOR EMBARK

### PASS FAI L

1. Remove washer hose from fitting.
2. Raise wiper arm.
3. Press lever and remove wiper arm from shaft.
4. Repeat Steps above for other wiper arm.
5. Close defroster flaps.

### Cab Unit

1. Windshield - Turn four allen screws counterclockwise approximately 180° in four latches to release rear wall.

   **NOTE:** Roof will need to be raised approximately one foot to allow rear wall to be folded in.

2. Fold rear wall inside cab and latch rear wall to cab ceiling with two latches.

3. Remove cable ties from latches.

   **NOTE:** If assistance is required for removal of cable ties, contact Second Echelon Maintenance.

4. Release two latches in upper front corners of cab.
(5) With the aid of an assistant, lift cab roof and slide forward until cab roof is positioned over hood.

(6) Roll down cab door windows.

(7) Release two latches on cab doors and fold top of doors down.

(8) Release two latches in lower corner of back window.

*WARNING:* When lowering cab sidewalls, walls will become detached from cab. Remove with care to prevent damage to equipment and possible injury to personnel.

(9) Lower cab side down 90° and remove tracks. Store cab side walls inside cargo body.

(10) Pull mirror assemblies downward. Rotate mirrors 180° until mirrors face inward.

(11) If ladder is mounted on tailgate, remove and attach ladder to side of cargo bed

f. Muffler and Exhaust Stack

<table>
<thead>
<tr>
<th>PASS</th>
<th>FAIL</th>
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</table>

[Diagram of exhaust stack, muffler, and exhaust part with labels like Rain Cap, Tether, and Muffler Tab]
### PREPARATION FOR EMBARK

#### WARNING:
Muffler and exhaust may still be hot. Allow muffler and exhaust stack to cool. Failure to comply may result in serious injury to personnel.

1. Remove clamp and exhaust stack from muffler. Store exhaust stack inside cargo body.
2. Install clamp on muffler
3. Install rain cap in exhaust part of muffler
4. Attach loose end of tether to muffler tab

#### Raising Vehicle Height After Transport

1. Position cab side walls in tracks at 90° to sides of cab. Align and raise cab side walls and secure with latches located on rear of cab.
2. Position top of doors in upward position and secure with latches.

**Caution:** While raising cab roof, ensure wires do not bind or become pinched. Failure to comply may result in failure of equipment.

**Note:**
While raising cab roof, ensure wires in front left corner of cab are fully positioned in the corner between doorframe and windshield frame.

3. With the aid of an assistant, lift cab roof and slid towards rear until cab roof is properly positioned over cab side walls.
4. Secure cab roof to cab side walls with latches located in upper front corners of cab.

**Note:** If required, Contact Second Echelon Maintenance for replacement cable ties.
<table>
<thead>
<tr>
<th></th>
<th>PASS</th>
<th>FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>Install cable ties to latches.</td>
<td></td>
</tr>
<tr>
<td>WARNING: Rear wall must be supported prior to releasing from latches. Failure to comply may result in injury to personnel.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6)</td>
<td>Open latches and carefully lower rear wall.</td>
<td></td>
</tr>
<tr>
<td>NOTE: Roof will need to be raised approximately 1ft to allow rear wall to be positioned on rear of cab</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7)</td>
<td>Position rear wall against rear of cab.</td>
<td></td>
</tr>
<tr>
<td>(8)</td>
<td>Secure rear wall by turning four allen screws clockwise approximately 180° in latches.</td>
<td></td>
</tr>
<tr>
<td>(9)</td>
<td>Reposition mirrors to proper driving positions.</td>
<td></td>
</tr>
<tr>
<td>(10)</td>
<td>Press lever and install wiper arm in shaft.</td>
<td></td>
</tr>
<tr>
<td>(11)</td>
<td>Position wiper arm against windshield.</td>
<td></td>
</tr>
<tr>
<td>(12)</td>
<td>Install hose on fitting.</td>
<td></td>
</tr>
<tr>
<td>(13)</td>
<td>Repeat steps above for other wiper arm.</td>
<td></td>
</tr>
<tr>
<td>(14)</td>
<td>Remove air intake cap and clamp from air intake adapter.</td>
<td></td>
</tr>
<tr>
<td>(15)</td>
<td>Remove clamp and air intake adapter from hump hose.</td>
<td></td>
</tr>
<tr>
<td>(16)</td>
<td>Install air intake cap on air intake stack with clamp.</td>
<td></td>
</tr>
<tr>
<td>(17)</td>
<td>Remove two screws and locknuts from clamp.</td>
<td></td>
</tr>
<tr>
<td>(18)</td>
<td>Position clamp on hump hose.</td>
<td></td>
</tr>
<tr>
<td>(19)</td>
<td>Position air intake sack in hump hose.</td>
<td></td>
</tr>
</tbody>
</table>
**PREPARATION FOR EMBARK**

<table>
<thead>
<tr>
<th></th>
<th>PASS</th>
<th>FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>(20)</td>
<td>Secure air intake stack and clamp to bracket with two screw and locknuts.</td>
<td></td>
</tr>
<tr>
<td>(21)</td>
<td>Secure air intake stack in hump hose with clamp.</td>
<td></td>
</tr>
<tr>
<td>(22)</td>
<td>Remove tether from muffler tab.</td>
<td></td>
</tr>
<tr>
<td>(23)</td>
<td>Remove rain cap from muffler.</td>
<td></td>
</tr>
<tr>
<td>(24)</td>
<td>Remove clamp from muffler.</td>
<td></td>
</tr>
<tr>
<td>(25)</td>
<td>Install exhaust stack on muffler with clamp.</td>
<td></td>
</tr>
<tr>
<td>(26)</td>
<td>Adjust three seatbelt columns as required.</td>
<td></td>
</tr>
</tbody>
</table>