DEPARTMENT OF THE AIR FORCE
Headquarters US Air Force
Washington, D.C. 20330-1030

QTP24-3-C104
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Wrecker

Vehicle Management Codes: C104, C108, C113, C114, C116 – C118, C120, F115, L107, L114

QUALIFICATION TRAINING PACKAGE

CONTENTS

Section 1—OVERVIEW.

1.1. Overview.

1.1.1. Send comments and suggested improvements on AF Form 847, *Recommendation for Change of Publication* through Air Force Installation and Mission Support Center (AFIMSC) functional managers via e-mail at AFIMSC.IZSL.VehicleOps@us.af.mil.

1.1.2. How to use this plan:

1.1.2.1. Instructor:

1.1.2.1.1. Provide overview of training, **Section 2** and **Section 3**.

1.1.2.1.2. Instructor's lesson plan for trainee preparation, give classroom lecture, **Section 4**.

1.1.2.1.3. Instructor's lesson plan for knowledge lecture, **Section 5**.

1.1.2.1.4. Instructor's lesson plan for demonstration, **Section 6**.

1.1.2.1.5. Instructor's lesson plan for performance and evaluation, **Section 7**.

1.1.2.2. Trainee:

1.1.2.2.1. Reads this entire lesson plan prior to starting lecture.

1.1.2.2.2. Follows along with lecture using this lesson plan and its attachments.

1.1.2.2.3. Uses **Attachment 2** and **Attachment 4** as guides for vehicle inspection.

1.1.2.2.4. Takes performance test.

Section 2—RESPONSIBILITIES

2.1. Responsibilities.

2.1.1. The trainee shall:

2.1.1.1. Ensure the trainer explains the Air Force Qualification Training Plan (AFQTP) process and the responsibilities.

2.1.1.2. Review the AFQTP/Module/Unit with the trainer.

2.1.1.3. The trainee should ask questions if he/she does not understand the objectives for each unit.

2.1.1.4. Review missed questions with the trainer.

2.1.2. Instructor shall:

2.1.2.1. Review the AFQTP with the trainee.

2.1.2.2. Conduct knowledge training with the trainee using the AFQTP.

2.1.2.3. Grade the review questions using the answer key.

2.1.2.4. Reviews any questions from the trainee to ensure the required task knowledge has been gained to complete the task.

2.1.2.5. Sign-off the task(s).

2.1.3. The Certifier shall:

2.1.3.1. Evaluate the Airman's task performance without assistance.

2.1.3.2. Sign-off the task(s).

Section 3—INTRODUCTION

3.1. Objectives.

3.1.1. Given lectures, demonstrations, hands-on driving session, trainees will be able to perform operator's inspection and complete the performance test with zero instructor assists.

3.1.2. Train and qualify each trainee in safe operation and preventive maintenance of the various wreckers.

3.1.3. This training will ensure the trainee becomes a qualified wrecker operator; an operator who has the knowledge and skills to operate a wrecker in a safe and professional manner.

3.2. Desired Learning Outcomes.

3.2.1. Understand the safety precautions to be followed before, during, and after operation of the wrecker.

3.2.2. Understand the purpose of the wrecker and their role in the mission.

3.2.3. Know the proper operator maintenance procedures of the wrecker, in accordance with (IAW) applicable technical orders (TOs) and use of AF Form 1800, *Operator's Inspection Guide and Trouble Report* (General Purpose Vehicles).

3.2.4. Safely and proficiently operate the wrecker.

3.3. Lesson Duration.

3.3.1. Recommended instructional and hands on training time is 41 hours:

Figure 3.1. Recommended Training Time for Training Activities.

Training Activity	Training Time
Trainee's Preparation	2 Hours
Instructor's Lecture	2 Hours
Instructor's Demonstration	4 Hours
Trainee's Personal Experience (to build confidence and proficiency) ▪ Perform Operator Maintenance ▪ Operate the Vehicle	30 Hours
Trainee's Performance Evaluation	2 Hours

Note: This is a recommended time; training time may be more or less depending how quickly a trainee learns new tasks.

3.4. Instructional References.

3.4.1. AF Form 1800.

3.4.2. Risk Management (RM) and Safety Principles.

3.4.3. Applicable TOs or Manufacturer's Operator's Manual (see Vehicle Management for TO number for vehicle being used in training).

3.4.4. Air Force Manual (AFMAN) 24-306, *Operation of Air Force Government Motor Vehicles*.

3.4.5. United States Department of Transportation, Federal Motor Carrier Safety Administration; on-line at http://www.fmcsa.dot.gov/.

3.4.6. Special references based-off type of vehicle.

3.5. Instructional Training Aids and Equipment.

3.5.1. Wrecker Lesson Plan.

3.5.2. Wrecker.

3.5.3. Applicable TO or Manufacturer's Operator's Manual.

3.5.4. AF Form 1800.

3.5.5. Videos (if locally produced).

3.5.6. Suitable training area.

3.5.7. Various types of vehicles to be towed.

3.5.8. Traffic cones.

Section 4—TRAINEE PREPARATION

4.1. Licensing Requirements.

4.1.1. Trainee must have in his/her possession a valid state driver's license.

4.1.2. AF Form 171, *Request for Driver's Training and Addition to U.S. Government Driver's License* IAW Air Force Instruction (AFI) 24-301, *Ground Transportation*.

4.1.3. Applicable local licensing jurisdiction requirements.

4.2. Required Reading (Testable Material).

4.2.1. Read this entire lesson plan.

4.2.2. Read AFMAN 24-306.

4.2.3. Read manufacturer's operator's manual for the vehicle being trained on.

Section 5—KNOWLEDGE LECTURE AND EVALUATION

5.1. Knowledge Overview (Lecture).

5.1.1. Past and present, recovery vehicles have been called wrecker, tow truck, tow car, tow ambulance, etc. For this training we will use the term "wrecker" during our discussion. Because of the varying Air Force (AF) missions and types of vehicles used, the AF has a variety of different wreckers to accomplish its vehicle recovery mission.

5.1.2. Like any other vehicle, training and licensing is a requirement to ensure the trainee can operate a wrecker safely and proficiently. Not only will he/she be challenged by recovering vehicles, but they will also be faced with dealing with accidents that involve vehicle overturns and cargo shifts and spills out on the roadways.

5.1.3. While the end objective is retrieving a vehicle, each type wrecker has its own characteristics for safely retrieving a vehicle. The following material will only provide a basic knowledge for wrecker operations, so it is imperative to review the operator's manual for the wrecker being operated.

5.2. Overview of Training and Requirements.

5.2.1. Training objectives:

5.2.1.1. Given lectures, demonstrations, hands-on driving session, trainees will be able to perform operator's inspection and complete the performance test with zero instructor assists.

5.2.1.2. Train and qualify each trainee in safe operation and preventive maintenance of the various wreckers.

5.2.1.3. This training will ensure the trainee becomes a qualified wrecker operator—an operator who has the knowledge and skills to operate a wrecker in a safe and professional manner.

5.2.2. Desired learning outcomes:

5.2.2.1. Understand the safety precautions to be followed before-, during-, and after-operation of the wrecker.

5.2.2.2. Understand the purpose of the wrecker and its role in the mission.

5.2.2.2.1. Role in the mission (Unit/Base/Community (during natural disasters)/Air Force).

5.2.2.2.2. Know the proper operator maintenance procedures of the wrecker, in IAW applicable technical orders and use of AF Form 1800.

5.2.2.2.3. Be able to safely and proficiently operate the wrecker.

5.2.2.2.4. Why is it important to safely and proficiently operate the wrecker?

5.2.2.2.4.1. Meet mission requirements.

5.2.2.2.4.2. Demonstrates a qualified trained professional operator

5.2.3. Wrecker Design. A wrecker is a truck that has a permanently affixed hoist, towing apparatus, or self-loading flatbed, or any combination of these items, used to transport vehicle. There are three basic types of wreckers. See **Figure 5.1.**, **Figure 5.2.**, and **Figure 5.3.**

5.2.3.1. Basic wrecker types:

5.2.3.1.1. Rollback: Rollback wreckers are ideal for most modern vehicles. They prevent damage to the underside of the vehicle and they are also ideal for vehicles that are totaled.

5.2.3.1.2. Hook: Special purpose and heavy vehicles (tractor-trailers) usually require a hook wrecker.

5.2.3.1.3. Wheel-lift: Medium duty wreckers have wheel-lifts for use with cars and small trucks.

5.2.3.1.4. Some wrecker designs allow the vehicle to serve a dual purpose of retrieving vehicles either by the wheel-lift or hook method.

5.2.3.1.5. Some flatbed wreckers are designed to tow an additional vehicle with an attached wheel-lift or hook attachment.

Figure 5.1. Flatbed Wrecker.

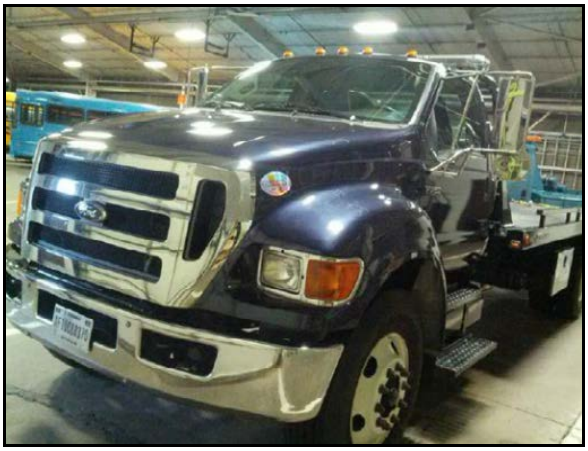


Figure 5.2. Wheel-Lift Wrecker.

Figure 5.3. Hook Wrecker.

5.2.3.2. Wrecker information found in the Manufacturer's Operator's Manual, the appropriate TO or on data plate. Information concerning the safe load capacity of a wrecker can be found on its data plate. The wrecker's data plate specifications are generally boom ratings, winch ratings, specification of the wire rope, and under lift ratings (rated loads/capabilities).

5.2.3.2.1. Boom rating.

5.2.3.2.2. Winch rating.

5.2.3.2.3. Specification of wire rope.

5.2.3.2.4. Under lift rating (rated loads/capabilities).

5.2.3.3. Components of the wrecker:

5.2.3.3.1. Truck (engine/chassis and cab). The towing portion of a wrecker is manufactured by a company different than the manufacturer of the truck. Common components found on the truck portion of the wrecker are air brakes and power take-off (PTO).

5.2.3.3.1.1. Air brakes (will be covered in detail later). See **Section 8**.

5.2.3.3.1.2. Power take-Off (PTO): The PTO control is located in the cab of the truck, either on the dashboard or on the floor.

5.2.3.3.1.2.1. When engaged, it supplies power to operate a hydraulic pump that powers the hoist cables or hydraulics used to raise and lower the tow bar assembly (hook) or to raise and extend the bed on flatbed wreckers.

5.2.3.3.1.2.2. The PTO operates on the power from the engine; during recovery operations engine speed can be controlled by a throttle control lever located in the cab of the vehicle and/or on the bed of the wrecker.

Note: CAUTION – Ensure the PTO is disengaged while traveling.

5.2.3.3.1.2.3. Supplies power to wrecker components.

5.2.3.3.1.2.4. Powered by truck engine.

5.2.3.3.1.2.5. Throttle control lever.

5.2.3.3.2. Towing assembly.

5.2.3.3.2.1. Common components.

5.2.3.3.2.1.1. Hoist control levers. The hoist-control levers are the control point for raising, lowering, and/or extending the tow bar, wheel-lift, flatbed and cable hoists. **Figure 5.4.** shows an example of hoist control levers on a wrecker.

5.2.3.3.2.1.2. Throttle control lever. It controls the engine idle speed from the rear of the wrecker. Remember, the heavier the vehicle, the faster the wrecker idle speed.

Note: CAUTION – Never operate the wrecker with the throttle control lever engaged.

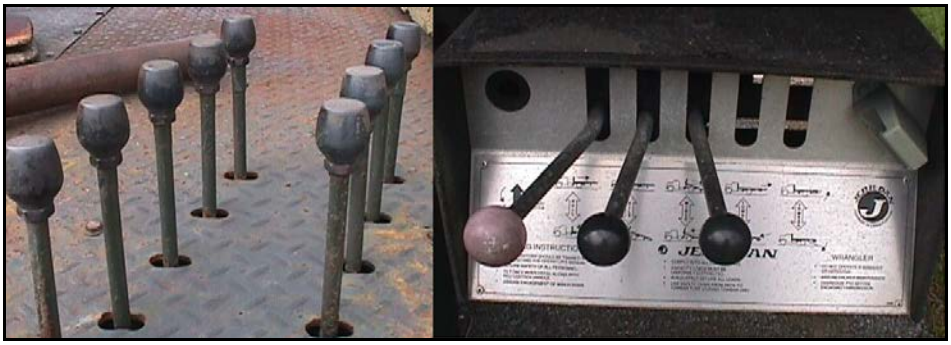
5.2.3.3.2.1.3. Hoist cables and cable spools. The cables operate various raising and lifting components, to pull vehicles on flatbeds, and for snatch block operations (explained later).

5.2.3.3.2.2. Warning lights.

5.2.3.3.2.2.1.1. Other than the four-way emergency flashers, wreckers have additional beacon type lights mounted on the upper most part of the wrecker.

5.2.3.3.2.2.1.2. During recovery operations, these additional warning lights help to warn/caution other motorist to slow down. They serve as a safety device to the operator as well as warning to passing and oncoming traffic.

Figure 5.4. Hoist Control Levers.



5.2.3.3.3. Flatbed wrecker. There are two main components; the bed that raises and extends out to allow a vehicle to be pulled onto the bed and the cable spool that is used to retrieve the disabled vehicle onto the bed of the wrecker.

5.2.3.3.4. Wheel-lift wrecker, main component is the wheel-lift. Has one main component, the wheel-lift mechanism (see **Figure 5.5.),** which is usually driven by hydraulics. It extends out and under the vehicle and then picks up the vehicle by either the front or rear wheels.

5.2.3.3.5. Hook wrecker.

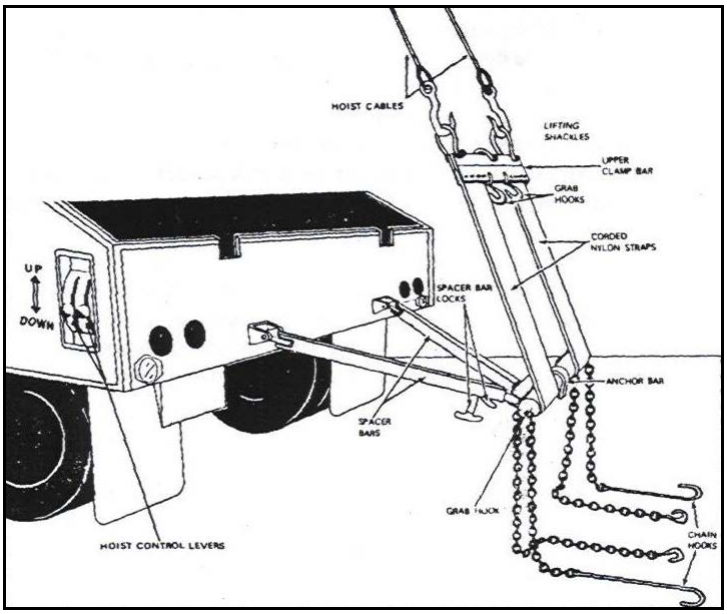
Figure 5.5. Wheel-Lift Component.

5.2.3.3.5.1. Tow bar assembly (sling and regular tow bar, usually padded with rubber). See **Figure 5.6.**

5.2.3.3.5.1.1. Sling tow bar assembly. The spacer maintains a positive space between the towed vehicle and the wrecker. The chain hooks are hooked to the

rear axle of the tow vehicle and then hooked onto the tow bar of the wrecker. The hoist cables then lift up the vehicle.

Figure 5.6. Sling Tow Bar Assembly.



5.2.3.3.5.2. Boom.

5.2.3.3.5.2.1. The boom supports the weight of the vehicle being towed. The hoist cables run through the boom.

5.2.3.3.5.2.2. The boom is adjustable, the heavier the load, the higher the boom should be raised (usually no more than 30-45 degrees). Heavier loads will put more weight on the rear of the vehicle, causing the front wheels to leave the ground.

5.2.3.3.5.2.3. Raising the boom will place more weight on the front wheels. Some booms split in the middle and swing out to the side of the wrecker for recovery type operations.

Note: CAUTION – Never raise or lower the boom when a vehicle is attached to the tow bar assembly. Doing so could cause injury to the operator and/or others, and it could damage the wrecker.

5.2.3.3.6. Outriggers.

5.2.3.3.6.1. Some wreckers are equipped with two outriggers, located on both sides of the vehicle just behind the cab of the truck. They are used to stabilize the wrecker during recovery operations when the boom is swung to the side of the wrecker.

Figure 5.7. Scotch Blocks.

5.2.4. Equipment, equipment use and physics application.

5.2.4.1. Scotch blocks (rear wheel chocks). Hook wreckers come equipped with rear scotch blocks for use in snatch block recovery operations. They are used in conjunction with parking brakes.

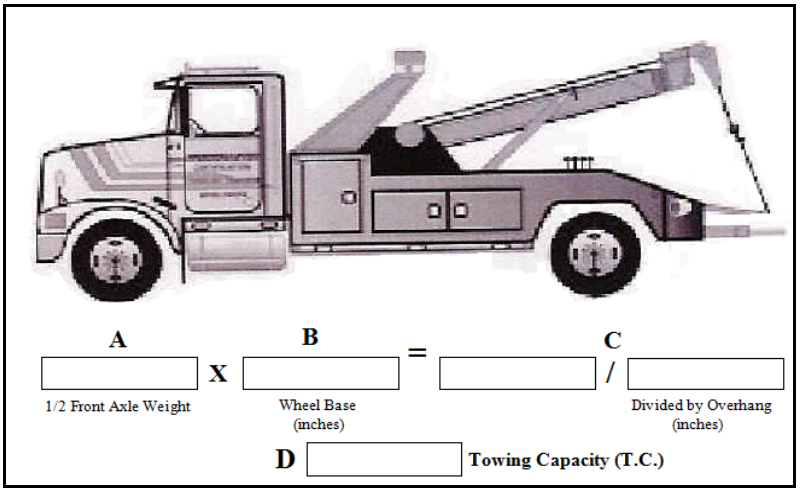
5.2.4.2. Weights/Formulas. The following formula is used to indicate the towing capacity of any given tow truck. The alpha characters in **Table 5.1.** below correspond with the alpha characters in **Figure 5.8.** The most immediate source of information concerning load capacity of a wrecker can be found in its data plate. Weight of towed vehicles can be found on the data plate or commercial capacity label on the driver's door.

Table 5.1. Weights/Formulas.

Variable	Description
A	Weigh the truck, driver, fuel, and all equipment on any conventional weight scale. (In pounds, record as #1)
B	Measure the distance between the centers of the front axle and the rear axle. (In inches, record as #2)
C	Measure the distance from the center of the rear axle to the towing position of the tow bar or cross arm. (In inches, record as #3)
D	Divide front axle weight (#1) by 2; multiply that number with wheel base (#2). Sum is known as inch pounds. Divide inch pounds by overhang (#3). Sum is the tow capacity of truck.

Note: Always tow within the three basic ratings (Gross Axle Weight Rating [GAWR], Gross Combination Weight Rating [GCWR], and Gross Vehicle Weight Rating [GVWR]).

Figure 5.8. Towing Capacity Determination Formula.



5.2.4.3. Survey the scene. Other than recovering the disabled vehicle, the trainee will be required to ensure the work area is safe and conducting a preliminary analysis of the scene.

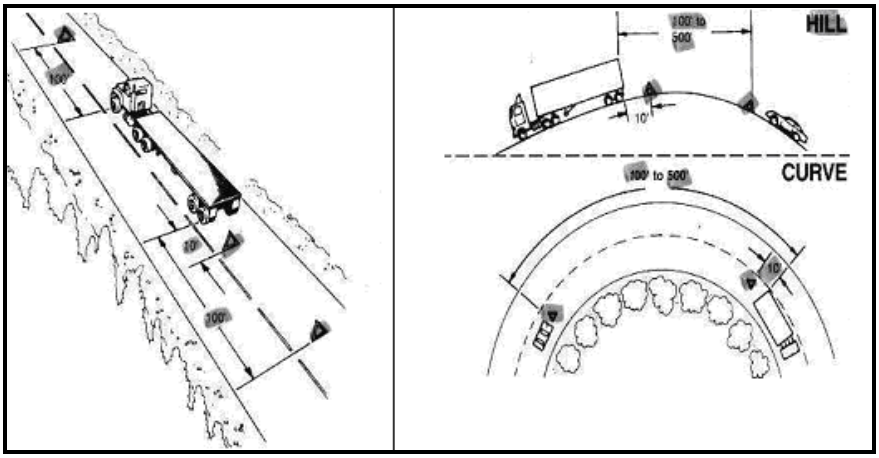
5.2.4.4. Emergency warning devices. Follow these guidelines when placing warning devices (warning triangles or flares). Use extreme caution due to moving traffic.

5.2.4.4.1. Two-lane road. Traffic side of vehicle, 10ft front and 10ft/100ft rear. See **Figure 5.9.**

5.2.4.4.2. Curves/hills. 10ft and 300ft to the rear. See **Figure 5.9.**

5.2.4.4.3. Divided highway. 10ft, 100ft, and 200ft to the rear. See **Figure 5.9.**

Figure 5.9. Tow-Lane (Left) and Curves and Hills (Right).



5.2.4.5. Hazardous materials. Survey the scene prior to any recovery operations. A few examples of hazards are leaking fluids (especially dangerous are explosive types) and hazardous chemical spills. Immediately clear the scene if hazardous materials are present and proceed only when give authorization from appropriate authorities.

5.2.4.6. Check the weight of disabled vehicle.

5.2.4.7. Some locations may ask the operator to take pictures of the disabled/wrecked vehicle at the accident scene.

5.2.4.8. Determine points of pickup on the disabled vehicle.

5.2.4.9. Hoist cables and cable spools. The following are safe practices for the use of cables and cable spools:

5.2.4.9.1. Crossover. Uneven winding of the cable across the drum will cause excessive abuse of the cable, ensure the cable is rewound correctly, do not allow the cable to crossover; keep it uniform on the drum.

Note: To wind the cable correctly and prevent crossover, place a weight on the end of the cable (on the hook) and wind cable.

5.2.4.9.2. Freewheeling. When necessary to let out large amount of cable, release the freewheeling cable device on the drum and pull out manually. Failure to follow these procedures may result in crossover.

5.2.4.10. Chains, hooks and snatch blocks.

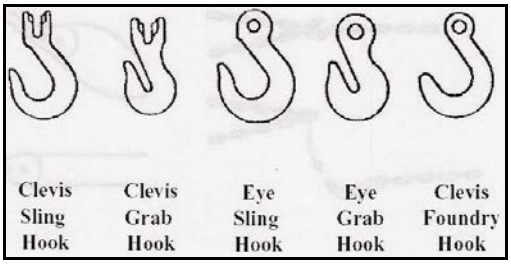
5.2.4.10.1. Chains. Not all chains are suitable for towing/recovery. Use the table below for the recommended chain types for towing/recovery.

Figure 5.10. Recommended Towing/Recovery Chain Types.

Grade 7 Transport Chain (Towing)			Grade 8 Alloy Chain (Recovery)		
Chain Size (in.)	**Weight per 10 ft. (lbs.)**	**Working Load Limit (lbs.)**	**Chain Size (in.)**	**Weight per 10 ft. (lbs.)**	**Working Load Limit (lbs.)**
1/4	8.1	3,150	9/32 (1/4)	7.2	3,500
5/16	9.8	4,700	5/16	11.4	5,400
3/8	14.1	6,600	3/8	14.8	7,100
7/16	21.6	8,750	1/2	24.3	12,000
1/2	24.6	11,300	5/8	35.1	18,100
			3/4	58.4	28,300
			7/8	70.5	34,200
5/8 Grade 8 – Heavy recovery ~ 1/2 Grade 8 – Medium recovery ~ 3/8 Grade 8 – Light recovery.					
Note: CAUTION – Working Load Limit: This is the maximum load in pounds, which should ever be applied to the chain, when the chain is in new or like new condition. This rating applies when the load is uniformly applied, in direct tension, to a straight length of chain. The operator puts themselves and others at risk of injury or death anytime they exceed limits. Ensure he/she inspect chains before each use.					

5.2.4.10.2. Hooks. There are many types of hooks; the eye grab hook is the most popular used by wrecker manufacturers. The clevis grab hook is also another option (see **Figure 5.11.**).

Figure 5.11. Hook Types.



5.2.4.10.3. Snatch blocks. A snatch block is a pulley with a hook on one end. Properly used a snatch block will increase the winching capability during recovery operations.

Note: WARNING – Misused or poorly maintained blocks are killers of wrecker personnel. Always ensure the hook is in the correct winching position.

5.2.4.10.3.1. If the hook fails, it will move in the direction of the back of the hook. Therefore, always place the hooks so their back is facing the ground or away from the operator. Because there are different types of snatch blocks, the operator may want to consider having an instruction book that will show the maintenance and operation of the snatch block.

5.2.4.10.3.2. Do not winch two snatch blocks closer together than 36 inches.

5.2.4.10.4. Inspection. Check points to consider:

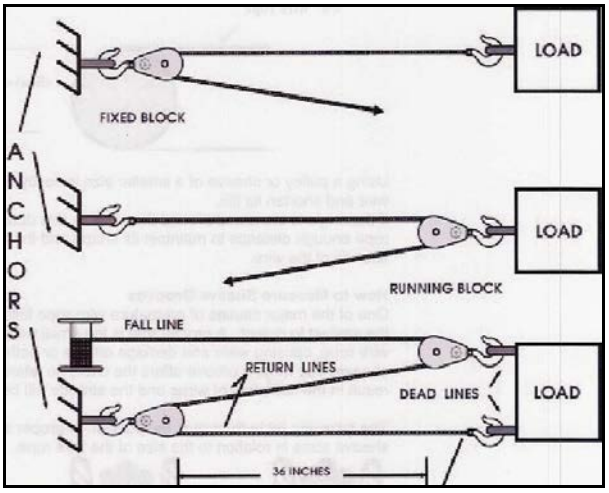
5.2.4.10.4.1. Check wear and deformities on pins, side plates, bushings or bearing.

5.2.4.10.4.2. Look for misalignment or wobble in the sheaves.

5.2.4.10.4.3. Inspect security of nuts, bolts, pins, and other locking methods.

5.2.4.10.4.4. Lubricate frequently depending on use and environmental conditions.

Figure 5.12. Snatch Block Configurations.



5.2.4.11. General Tow Procedures. Do not tow a vehicle on its drive wheels unless steps have been taken to protect its transmission and differential. This may require the drive shaft removal (only on rear wheel drive vehicles) to prevent damage to the transmission or the use of a tow dolly on the trailing wheels.

5.2.4.11.1. The best option is to use the tow dolly due to the complexity and tools required to remove the drive shaft. If the drive shaft has to be removed, recommend a vehicle mechanic remove it.

5.2.4.11.2. When towing a vehicle from the rear, ensure the steering wheel is secured with the front wheels straight. Most wreckers are equipped with a strap/hook device for securing the steering wheel. If a strap/hook device is not available, then use a rope, strap, or chain to secure the steering wheel.

5.2.4.11.3. Always use two safety chains on a tow.

5.3. Vehicle Inspection.

5.3.1. Types of vehicle inspection. If discrepancies are found they must be reported to Vehicle Control Official (VCO), the supervisor, and/or vehicle maintenance:

5.3.1.1. Pre-trip inspection – find items/problems that could cause accident or breakdown.

5.3.1.1.1. Approaching the vehicle.

5.3.1.1.1.1. Notice general condition.

5.3.1.1.1.2. Look for exterior damage.

5.3.1.1.1.3. Fluid leaks.

5.3.1.1.2. Wheels and rim:

5.3.1.1.2.1. Damaged rims.

5.3.1.1.2.2. Correct air pressure (where to find recommended air pressure).

5.3.1.1.2.3. Loose or missing lug nuts.

5.3.1.1.2.4. Dual tire valve stem 180 degrees apart.

5.3.1.1.2.5. Mismatched tire sizes and tread design.

5.3.1.1.2.6. Cuts, tread separation, and sidewall damage.

5.3.1.1.2.7. Cut or cracked valve stems and valve stem cap.

5.3.1.1.2.8. Proper tread depth (4/32 GMV, 2/32 Commercial Design).

5.3.1.1.2.9. Leaks around rear axle.

5.3.1.1.2.10. Tread separation.

5.3.1.1.3. Engine:

5.3.1.1.3.1. Leaks.

5.3.1.1.3.2. Engine oil level.

5.3.1.1.3.3. Windshield washer fluid level.

5.3.1.1.3.4. Coolant level and radiator hoses.

5.3.1.1.3.5. Transmission/hydraulic fluid level.

5.3.1.1.3.6. Cracked, worn, or exposed electrical wiring.

5.3.1.1.3.7. Check belts for ¼ inch movement, frays and excessive wear.

5.3.1.1.3.8. Battery fluid, terminal corrosion, connections, and tie-downs.

5.3.1.1.4. Exhaust system:

5.3.1.1.4.1. Exhaust parts that are leaking.

5.3.1.1.4.2. Loose, broken, or missing exhaust pipes, mufflers, or tailpipes.

5.3.1.1.4.3. Loose, broken, or missing mounting brackets, clamps, bolts, or shielding plate.

5.3.1.1.5. Steering system:

5.3.1.1.5.1. Missing nuts, bolts, cotter keys, or other parts.

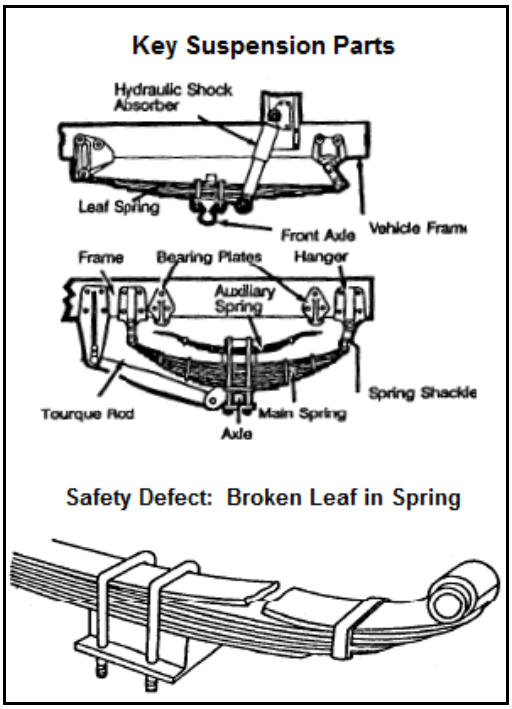
5.3.1.1.5.2. Steering wheel play of more than two inches.

5.3.1.1.5.3. Power steering pump, hoses, and fluid level.

5.3.1.1.5.4. Bent, loose, or broken parts, such as steering column, steering gear box, or tie rod ends.

5.3.1.1.6. Suspension system.

Figure 5.13. Suspension System.



5.3.1.1.6.1. Spring hangars that allow movement of axle from proper position.

5.3.1.1.6.2. Cracked or broken spring hangers.

5.3.1.1.6.3. Missing or broken leaves.

5.3.1.1.6.4. Broken leaves that have shifted and may hit tires or other parts.

5.3.1.1.6.5. Leaking shock absorbers.

5.3.1.1.6.6. Torque rod or arm, U-bolts, spring hangers or other axle positioning parts that are cracked damaged or missing.

5.3.1.1.6.7. Any loose, cracked, broken or missing frame members.

5.3.1.1.7. Check controls for proper operations (interior/exterior).

5.3.1.1.7.1. Clutch.

5.3.1.1.7.2. Mirrors.

5.3.1.1.7.3. Accelerator.

5.3.1.1.7.4. Brake pedal.

5.3.1.1.7.5. Parking brake.

5.3.1.1.7.6. PTO.

5.3.1.1.7.7. Horn(s).

5.3.1.1.7.8. Heater/fan controls.

5.3.1.1.7.9. Hydraulic lift controls.

5.3.1.1.7.10. Door latches and locks.

5.3.1.1.8. Lights:

5.3.1.1.8.1. Headlights (high and low beam).

5.3.1.1.8.2. Turn signals and four way flashers.

5.3.1.1.8.3. Interior cab lights.

5.3.1.1.8.4. Clearance lights.

5.3.1.1.8.5. Spot lights.

5.3.1.1.8.6. Warning lights (beacons).

5.3.1.1.8.7. Work area illumination lights.

5.3.1.1.9. Transmission controls.

5.3.1.1.10. Windshield wipers/washers.

5.3.1.1.11. Back-up warning buzzer.

5.3.1.1.12. Seatbelts.

5.3.1.1.13. Forms.

5.3.1.1.14. Recovery components:

5.3.1.1.14.1. Boom.

5.3.1.1.14.2. Wheel-lift.

5.3.1.1.14.3. Winch cables (also called wire ropes). Immediately have damaged cables replaced, failure to do so can result in cable backlash, which may cause injury or death. The following are items to look for:

5.3.1.1.14.3.1. Properly lubricated.

5.3.1.1.14.3.2. No frays or cuts in cable.

5.3.1.1.14.3.3. Has not been crushed.

5.3.1.1.14.3.4. No kinks.

5.3.1.1.14.3.5. No bird caging. The twisting of the wire rope in an isolated area in the opposite direction of the rope lay, causing it to take on a bird cage appearance.

5.3.1.1.14.3.6. Properly wrap around on cable spool.

5.3.1.1.14.3.7. Loose cable fastening devices. Need to ensure they are properly installed and securely fastened. These devices are located at a hanging point, for the wrecker, this is going to be where the hook attaches to the cable. Two most common types of fasteners are the U-bolt wire clip and compression sleeve (see **Figure 5.14.**). The U-bolt wire clips have a correct and incorrect way of being fastened to the cable (see **Figure 5.15.**). The saddle of the clip rests against the ``live" portion of the wire rope while the U-bolt rests on the short end of the cable (also called the “dead” portion of the cable). Using clips improperly severely weakens the connection, making it unsafe. A good way to remember if fastened correctly is “never saddle a dead horse”.

Note: Report any type of cable damage found to the VCO or the supervisor immediately.

Figure 5.14. Cable Frays and Cuts (Left) and Cable U-bolt Wire Clip and Compression Sleeve (Right).

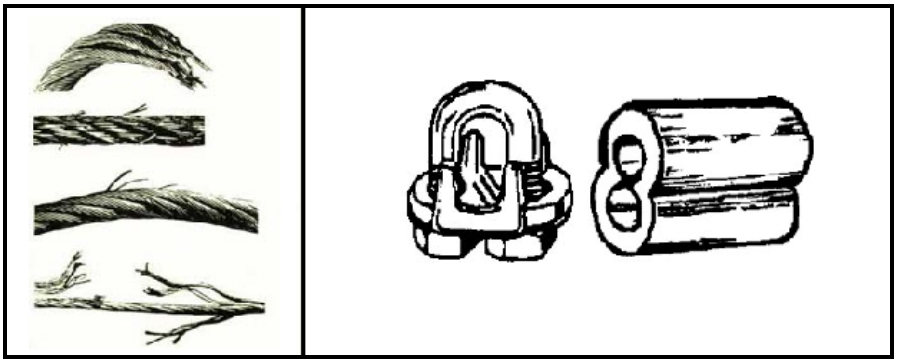
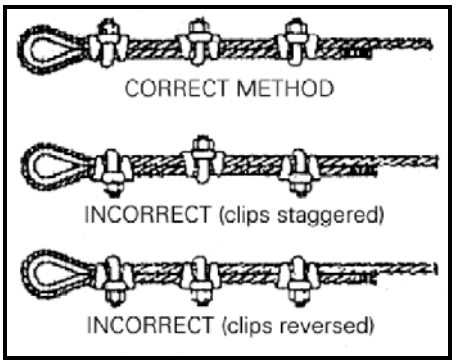


Figure 5.15. Correct and Incorrect Methods for U-Bolt Wire Clips.



5.3.1.1.15. Pulleys.

5.3.1.1.16. Tow bar and/or tow bar sling.

5.3.1.1.17. Outriggers.

5.3.1.1.18. Pintle hook is equipped.

5.3.1.1.19. Exposed gears, check for condition/damage and proper lubrication.

5.3.1.2. Emergency equipment (mandatory items):

5.3.1.2.1. Fire extinguisher(s) (properly charged, inspection is current, and secured).

5.3.1.2.2. Warning devices for parked vehicles (warning triangles and/or flares).

5.3.1.2.3. First aid kit (ensure restocked and not expired).

5.3.1.2.4. Towed vehicle light attachments.

5.3.1.3. Inspections during operations:

5.3.1.3.1. All gauges and warning lights for proper operations: Warning lights, gauges and indicators.

5.3.1.3.1.1. Most warning lights will show when the ignition is in the start position to show proper operation of the bulb. Some gauges will “peg” to one side showing operation. Once the engine has started these warning lights should go out and gauges will go to appropriate readings.

5.3.1.3.1.2. It is important to become familiar with the proper operating readings of gauges; specific meaning of warning and indicator lights and what to do if indications are warning of a malfunction on the wrecker being operated.

5.3.1.3.1.3. Some wreckers will have all these items and some will be limited. Along with indicators and gauges; warning lights may service the same function.

5.3.1.3.1.4. Warning lights provide notification to situations that require immediate attention.

5.3.1.3.1.4.1. Low air pressure light – wait for pressure to build up before moving wrecker.

5.3.1.3.1.4.2. Low engine oil light – check engine oil level.

5.3.1.3.1.4.3. Parking light is engaged – will remain on until parking brake is released.

5.3.1.3.1.5. Gauges: Gauges let the operator monitor wrecker systems.

Table 5.2. Gauges.

Display	Description	Response
	**Hour Meter -** operates when the key switch is ON and the engine is running.	Periodic maintenance and vehicle rotations are based on these hours.
	**Ammeter -** actuates once the ignition switch is ON, shows the amount of AMPS the alternator is putting out.	Normal ammeters indicate red or green. If the gauge shows red check for alternator belt tension first.
	**Transmission Oil Temperature -** actuates once the ignition switch is ON, shows reading of transmission fluid temperature.	During heavy movement or driving on inclines the transmission temperature will increase. If it shows over heating discontinue use and let the vehicle cool. Check fluid level.
	**Coolant System Temperature -** actuates once the ignition switch is ON, shows reading of engine coolant temperature.	During heavy movement or driving on inclines the transmission temperature will increase. If it shows over heating discontinue use and let the vehicle cool. Check coolant level.
	**Engine Oil Pressure -** actuates once the ignition switch is ON and the engine is running, shows reading of engine oil pressure	When the engine is cold and oil viscosity is less, the gauge should read a high oil pressure. If oil pressure drops below required level, discontinue use; check engine oil level.
	**System Air Pressure -** actuates once the ignition switch is ON, shows reading of system air pressure.	To release the parking brake, system air pressure normally requires 60 psi. Some systems are split and the gauge will have two indicators. If air pressure drops below required level the parking brakes will apply.

5.3.1.3.2. Wrecker controls. Refer to Manufacturer's Operator's Manual for more information regarding controls on specific wrecker type.

5.3.1.3.3. Unusual noises. Listen for any unusual, irregular motions, or vibrations. Use the senses to check for problems (look, listen, smell, feel). If encountered, the operator should stop the wrecker and investigate the cause, if cause cannot be determined, then report to the Squadron VCO, the supervisor, and/or vehicle maintenance.

5.3.1.3.4. Listen for exhaust and air leaks. Exhaust leaks are often confused with other sounds. Exhaust systems can leak from anywhere, though the mating flanges at the cylinders; silencer and tailpipe extensions are the usual spots. Another typical exhaust sound is a whistle as the engine is accelerated. For air leaks, there may be escaping air, a continuous hissing noise. Also, low air pressure may be an indicator there may be an air leak.

5.3.1.4. After operation inspection:

5.3.1.4.1. All gear is properly stowed (i.e. chains, hooks, dolly, etc.).

5.3.1.4.2. Cables are properly aligned on spool.

5.3.1.4.3. Ensure the wrecker is cleaned.

5.3.1.4.4. Refueled.

5.3.1.4.5. Perform a walk around inspection.

5.3.1.4.6. Drain air tanks if applicable.

5.3.1.5. Pre-trip vehicle inspection test. Use **Attachment 2** as a walk around guide along with AF Form 1800.

5.3.2. A Seven-Step Inspection Method will help ensure the inspection is the same each time it is conducted, and that nothing is left out. See **Attachment 4** for the Seven-Step Inspection Method.

Note: Report any safety type discrepancy to the VCO or the supervisor for action. Remove vehicle from service immediately**.**

5.4. Vehicle Safety and Equipment.

5.4.1. Hazards and human factors:

5.4.1.1. Traffic while retrieving a disabled vehicle.

5.4.1.2. Crush points when backing the wrecker to the disabled vehicle. Never allow anyone to stand between the disabled vehicle and wrecker.

5.4.1.3. Cables. Under tension they present the greatest danger. Always stay outside of the danger zone.

5.4.1.4. Common operator mishaps:

5.4.1.4.1. Lifting a towed vehicle beyond the wrecker's capability.

5.4.1.4.2. Jerky starts and stops.

5.4.1.4.3. Traveling too fast.

5.4.1.4.4. Turning too sharply.

5.4.1.4.5. Cutting corners too sharply.

5.4.1.4.6. Not properly securing the towed vehicle.

5.4.2. Safety clothing and equipment:

5.4.2.1. Safety steel-toed boots must be worn.

5.4.2.2. Gloves will be worn during recovery operations unloading (take off rings/jewelry first.

5.4.2.3. Reflective vest will be worn during recovery operations. The vest will make the operator more visible to the traffic.

5.4.2.4. First aid kit.

5.4.2.5. Warning triangles or flares.

5.4.2.6. Fire extinguisher.

5.4.2.7. Coveralls.

5.4.2.8. Raingear, cold weather gear, etc.

5.4.2.9. Eye protection.

5.4.2.10. Hearing protection.

5.4.2.11. Driving Safely in addition to Standardized Government Motor Vehicle Lesson Plan.

5.4.2.12. AF Form 1800.

5.5. Driving Safety and Precautions.

5.5.1. Overview Safety and Precautions. The following are safety items and procedures to be followed during wrecker operations. The Manufacturer's Operator's Manual will also provide safe operating procedures and the vehicle itself may have warning, cautions, and danger stickers that the Vehicle Operator should be aware of.

5.5.1.1. General Safety and Precautions.

5.5.1.1.1. Operator and passengers shall wear seat belts and shoulder harnesses as provided.

5.5.1.1.2. Wear appropriate personal protective equipment consistent with the hazard.

5.5.1.1.3. No personnel shall be allowed to ride anywhere, except in the cab of the wrecker and never to exceed the number of seatbelt equipped. Never let anyone ride in the towed vehicle.

5.5.1.1.4. Plan ahead to minimize or eliminate the need for backing. See AFMAN 24-306 for additional guidance on safe backing procedures.

5.5.1.1.5. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spot.

5.5.1.1.6. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.

5.5.1.1.7. Truck speed should be adjusted for load, traffic, and weather. Tire chains should be utilized as dictated by weather conditions.

5.5.1.1.8. Operators should be aware of personnel in the work zone.

5.5.1.1.9. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.

5.5.1.2. General wrecker operations safety.

5.5.1.2.1. Always turn-on four-way and warning (beacons) lights when arriving at the recovery scene and in traffic when towing a vehicle.

5.5.1.2.2. Do hook-ups from curb side to the maximum extent possible.

5.5.1.2.3. Do not operate, walk, or stand beneath boom or a suspended load to lift load.

5.5.1.2.4. Do not overload truck and always use proper engine speed and gear ratio to lift the load.

5.5.1.2.5. Never exceed load limit and/or boom rating (know the load and weight limits).

5.5.1.2.6. Never travel with the PTO control engaged.

5.5.1.2.7. Do not move wrecker with booms split or outriggers extended.

5.5.1.2.8. Do not use entire cable length.

5.5.1.2.9. Do not continue to wind the winch cable after the hook is against the boom end.

5.5.1.2.10. When the boom is raised, never put the selector in the down position and let go of the crank. A runaway crank could result in injury or death. Never use the crank when the boom has a load on it.

5.5.1.2.11. Never disengage the wrecker service drum engagement control when the cable is loaded.

5.5.1.2.12. Never apply lubricant or perform any kind of maintenance while wrecker equipment is operating.

5.5.1.2.13. Stay clear of all moving parts, cables, shafts, belts, flywheels, etc.

5.5.1.2.14. Do not move wrecker with an unsecured load hanging from boom.

5.5.1.2.15. Never get under a disabled vehicle that is raised by the wrecker. If the operator needs to get under a raised vehicle, it should have adequate safety blocks and/or jack stands in place.

5.5.1.2.16. Use two safety chains on all tows.

5.5.1.2.17. Do not tow a vehicle at night without proper signal lights on the towed vehicle and the wrecker.

5.5.1.2.18. Keep the towed load within one foot of the ground whenever possible.

5.5.1.2.19. Check boom before each use for cracks, deformities, oil leaks or loose pins, nuts and bolts.

5.5.1.2.20. When possible during dangerous and complicated vehicle recoveries, ensure other qualified wreckers operators assist in recovery.

5.5.2. Tire changing safety. If a tire is changed incorrectly, it can cause serious injury to the operator, surrounding personnel

5.5.2.1. Consider the vehicle location. Avoid changing a tire on a bridge, curve, road with no shoulder, etc.

5.5.2.2. Find a firm and level surface for the jack.

5.5.2.3. Turn-on four-way flashers.

5.5.2.4. Place warning triangles or flares prior to changing the tire.

5.5.2.5. Block the wheels - if changing a front tire, block the rear wheels, visa-versa if changing a rear tire.

5.5.2.6. Place the vehicle in "Park" if an automatic transmission and low gear if a standard shift. Apply the parking brake.

5.5.2.7. Ensure the jack is rated for the weight of the vehicle.

5.5.2.8. Ensure proper placement of jack (check for manufacturer's recommendation). If available, use jack stands after lifting the vehicle.

5.5.2.9. Once vehicle is lifted, NEVER at any time get under the vehicle.

5.5.2.10. Before removing lug nuts, ensure lug wedges are loose (double check).

5.5.2.11. After changing the tire, it is important to return the jack and lug wrench to the location recommended by the manufacturer. This prevents these tools from becoming a projectile, and makes them available for the next tire changing event.

5.5.2.12. Secure the removed tire and once it is repaired return the spare tire back to its proper location.

5.6. Wrecker Vehicle Operation.

5.6.1. Operating a wrecker with a vehicle attached is difficult. Extra attention should be taken due to the added weight and length added to the wrecker during recovery operations.

5.6.2. Accelerating. Gradually accelerate so the vehicle does not jerk. Rapid acceleration can cause mechanical failure and is considered vehicle abuse. During inclement weather, and towing operations speed should be gradually increased to prevent drive wheels from spinning.

5.6.3. Steering. Aim high in steering, which means always looking ahead at the vehicle in front. Watching for brake lights, turn signals, possible fog, etc.

5.6.3.1. Holding the steering wheel. Two hands are necessary during operation. Refer to AFMAN 24-306 for more information.

5.6.3.2. Right/left turns. When rounding a corner or making any sharp turns, use the hand-over-hand steering method. While completing the turn and release pressure on the steering wheel, it will slide through the hands because the front wheels tend to return to their normal straight forward position. Keep in mind the longer turning radius due to vehicle being towed with the hook and wheel-lift wreckers.

5.6.4. Shifting gears.

5.6.4.1. Using engine speed, revolutions per minute (rpm). Study the owner's manual for proper procedures for the vehicle being operated.

5.6.4.2. Use road speed, miles per hour (mph). Learn what speed each gear is designed for.

5.6.4.2.1. Knowing where/why to shift.

5.6.4.2.1.1. Steep grades. Make sure the vehicle is in a low enough gear to maintain a safe speed and to prevent the engine from stalling. On declines, the gear selected should be one lower than the gear used to climb the same hill. This will help prevent brake failure.

5.6.4.2.1.2. Curves. Downshift to help maintain control through the curve and to ensure proper gear selection when accelerating out of the curve.

5.6.5. Braking. Reference AFMAN 24-306. Maintain a space cushion; try to keep space around the vehicle at all times. Watch the following distance; due to the size and weight (more if towing a vehicle) use the three-second rule when following other vehicles.

5.6.5.1. Controlling speed. Adjust the speed depending on driving conditions.

5.6.5.2. Normal stopping. The following factors affect the ability to stop.

5.6.5.2.1. Speed.

5.6.5.2.2. Towing capacity.

5.6.5.2.3. Inclement weather.

5.6.5.2.4. Condition of tires and brakes.

5.6.5.2.5. Type and condition of road surface.

5.6.5.2.6. Weight of the wrecker. Increase when towing a vehicle.

5.6.5.3. Emergency stopping. For any speed, the distance required to stop a vehicle in an emergency depends on three things:

5.6.5.3.1. Perception distance. This is the distance the vehicle travels from the time the eyes see a hazard until the brain recognizes it.

5.6.5.3.2. Reaction distance. This is the distance traveled by the vehicle during which the driver determines the preventive action to be taken and actually sets the controls in motion.

5.6.5.3.3. Braking distance. The distance it takes to stop once the brakes are applied.

5.6.6. Backing. Many injuries and deaths have occurred from improper use of spotters. The majority of incidents and accidents can be avoided by using a spotter. Backing without a spotter should only be accomplished as a last resort. Exhaust every effort to locate a spotter. The following guidelines will be used during backing operations:

5.6.6.1. Operator and spotter should use spotting signals found in AFMAN 24-306 before backing.

5.6.6.2. The operator should always maintain visual contact with the spotter(s).

5.6.6.3. The operator must stop immediately if spotter moves out of the view or it is hard to understand the hand signals being.

5.6.6.4. Check clearance/surroundings.

5.6.6.5. Sound horn.

5.6.6.6. Use mirrors.

5.6.6.7. Pull forward to reposition.

5.6.6.8. Back slowly.

5.6.6.9. Avoid backing with an attached towed vehicle (hook wrecker). There is a potential to cause damage to the grill with the hoist cables.

5.6.7. Additional items.

5.6.7.1. Flightline rules and regulations (when applicable). Refer to AFMAN 24-306, AFI 13-213, *Airfield Driving*, and local flightline procedures.

5.6.7.2. Fire extinguisher training. Wreckers are equipped with fire extinguishers and training is required annually. The supervisor or Squadron VCO will schedule training with

the local Fire Department. The fire extinguisher itself must be inspected to ensure current inspection date, ensure needle is positioned in the green and ensure it is securely mounted.

5.6.7.3. Workplace policies and procedures. Understand local policies and procedures in regards to wrecker operations. If at a temporary duty location, take the time to learn the policies and procedures for the current location.

Section 6—EXPLANATION AND DEMONSTRATION

6.1. Instructor's Preparation.

6.1.1. Establish a training location.

6.1.2. Obtain appropriate vehicle operator's manual.

6.1.3. Schedule/reserve a wrecker.

6.1.4. If needed, schedule/reserve vehicles to be towed (if no training vehicle exists).

6.1.5. Ensure trainee completes AF Form 171.

6.2. Safety Procedures and Equipment.

6.2.1. The following safety items should be followed by both the instructor and trainee.

6.2.1.1. Chock wheel (if required) when wrecker is parked.

6.2.1.2. Remove all jewelry and identification tags.

6.2.1.3. Personal protective equipment and equipment items:

6.2.1.3.1. Safety steel-toed boots must be worn.

6.2.1.3.2. Gloves will be worn during cargo loading and unloading.

6.2.1.3.3. First aid kit.

6.2.1.3.4. Warning triangles.

6.2.1.3.5. Coveralls (if having to reach under the vehicle for chain hook-ups).

6.2.1.3.6. Raingear, cold weather gear, etc.

6.2.1.3.7. Reflective vest.

6.2.1.3.8. Hearing protection.

6.2.1.3.9. Eye protection.

6.2.1.4. The trainer and trainee should walk around vehicle to familiarize themselves with all warning labels and signs.

6.2.1.5. Ensure trainee wears seat belts.

6.2.1.6. Properly adjust driver's seat and all mirrors, if available.

6.2.1.7. Throughout demonstration, practice wrecker safety.

6.2.1.7.1. Always observe speed and safety precautions while carrying loads.

6.2.1.7.2. Keep loads within the rated capacity of the wrecker.

6.2.1.7.3. Additional passengers:

6.2.1.7.3.1. Only in cab of wrecker.

6.2.1.7.3.2. Never exceed number of seatbelts equipped.

6.2.1.7.3.3. Never let anyone ride in the towed vehicle.

6.2.1.7.4. Do not jump from vehicle, use handholds provided.

6.2.1.7.5. Do hook-ups from curb side to the maximum extent possible.

6.2.1.7.6. Minimize or eliminate the need for backing.

6.2.1.7.6.1. Use a spotter. (When a spotter is not available, exit wrecker and check clearances).

6.2.1.7.6.2. Operator and spotter agree on hand signals before backing. Refer to AFMAN 24-306 for standardized hand signals to use.

6.2.1.7.6.3. Always check to the rear before backing.

6.2.1.7.6.4. Stop immediately if the spotter moves out of the view of the mirror.

6.2.1.7.6.5. Ensure back-up alarms are working properly.

6.2.1.7.7. Do not operate, walk, or stand beneath boom or a suspended load.

6.2.1.7.8. Never travel with the PTO control engaged.

6.2.1.7.9. Do not move wrecker with booms split or outriggers extended.

6.2.1.7.10. Do not use entire cable length.

6.2.1.7.11. Do not continue to wind the winch cable when hook is against boom end.

6.2.1.7.12. Never put the selector in the down position and let go of the crank. Could result in injury or death. Never use the crank when the boom has a load on it.

6.2.1.7.13. Never disengage the wrecker service drum engagement control when the cable is loaded.

6.2.1.7.14. Never apply lubricant or perform any kind of maintenance while wrecker equipment is operating.

6.2.1.7.15. Stay clear of all moving parts, cables, shafts, belts, flywheels, etc.

6.2.1.7.16. Do not move wrecker with an unsecured load hanging from boom.

6.2.1.7.17. Never get under a disabled vehicle that is raised by the wrecker, must have adequate safety block or jack stands.

6.2.1.7.18. Use two safety chains on all tows.

6.2.1.7.19. Keep the towed load within one foot of the ground whenever possible

6.2.2. Practice basic AF RM process during demonstration:

6.2.2.1. Identify hazards.

6.2.2.2. Assess hazards.

6.2.2.3. Develop controls and make decisions.

6.2.2.4. Implement controls.

6.2.2.5. Supervise and evaluate.

6.3. Operator Maintenance Demonstration.

6.3.1. With trainee, accomplish vehicle inspection using AF Form 1800, *Operator's Inspection Guide and Trouble Report.* The vehicle inspection will follow the seven-step method as described in **Attachment 4**. An inspection guide (**Attachment 2**) can be used to ensure all areas of the wrecker are covered in addition to the "Operation Demonstration" guidelines provided below.

6.4. Operation Demonstration.

6.4.1. Throughout demonstration:

6.4.1.1. Allow for questions.

6.4.1.2. Repeat demonstrations as needed.

6.4.2. For all wreckers, within the training area, demonstrate and explain the following. **Note:** Use information contained on the data plate and/or the operator's manual. Next, proceed to the applicable wrecker type operation demonstration:

6.4.2.1. Wrecker capacities:

6.4.2.1.1. Boom rating.

6.4.2.1.2. Winch rating.

6.4.2.1.3. Specification of the wire rope.

6.4.2.1.4. Under lift rating (rated loads/capabilities).

6.4.3. Explain parking brake as they apply to wrecker being used.

6.4.3.1. Wrecker controls.

6.4.3.2. Warning lights.

6.4.4. Demonstrate and explain the following:

6.4.4.1. Basic controls and operations.

6.4.4.1.1. Stops signs to demonstrate start/stop.

6.4.4.1.2. Turns.

6.4.4.1.3. Proper space.

6.4.4.2. Parking.

6.4.4.3. Backing.

6.4.4.3.1. Set up cones to resemble size of a towed vehicle.

6.4.4.3.2. Using a spotter, use spotter signals found in AFMAN 24-306.

6.4.4.3.3. Continue until the student can show proficiency in operating.

6.4.4.4. Vehicle recovery.

6.4.4.5. Recovery operations.

6.4.5. Flatbed wreckers. Within the training area, demonstrate and explain the following. **Note:** These steps will vary based on the assigned flatbed wrecker type:

6.4.5.1. Ensure use of proper safety equipment.

6.4.5.2. Turn-on wrecker warning lights and 4-way flashers.

6.4.5.3. Show where warning triangles/flares should be placed (actually place if doing an actual wrecker run).

6.4.5.4. Loading a vehicle on the flatbed:

6.4.5.4.1. Always winch vehicle onto the deck of the wrecker; never drive onto the deck.

6.4.5.4.2. Use spotter when backing.

6.4.5.4.3. Reduce wrecker's engine to idle and apply parking brake.

6.4.5.4.4. Transmission in neutral and engage PTO.

6.4.5.4.5. Adjust engine speed to desired RPM using the throttle control.

6.4.5.4.6. Set parking brake and chock wrecker.

6.4.5.4.7. Tilt and extend flatbed according to the manufacturer's recommendations.

6.4.5.4.8. Never place a person between the raised bed and the frame of the truck.

6.4.5.4.9. Disengage winch, allowing for free spin.

6.4.5.4.10. Manually remove enough cable length as needed to attach to vehicle.

6.4.5.4.11. Attach cable harness, V-strap, or V-chain to a solid point at the lowest level of vehicle. (Be careful for brake lines and other delicate parts of the vehicle).

6.4.5.4.12. Attach cable to cable harness. Do not wrap cable around any object, attach using hook.

6.4.5.4.13. On towed vehicle, release parking brake and place in neutral.

6.4.5.4.14. Ensure all personnel are clear.

6.4.5.4.15. Slowly pull vehicle on to the deck.

6.4.5.4.16. Ensure towed vehicle is centered on bed.

6.4.5.4.17. Continue until towed vehicle is in place on bed.

6.4.5.4.18. On towed vehicle, set brake and place in park (to avoid transmission damage, refer to the vehicle owner's manual for proper procedures).

6.4.5.4.19. Retract and lower bed.

6.4.5.4.20. Secure towed vehicle to flatbed using safety chains.

6.4.5.4.21. Disengage the PTO.

6.4.5.4.22. Retrieve warning devices. Do not handle flares if still burning or warm.

6.4.5.5. Unloading towed vehicle off flatbed.

6.4.5.5.1. Engage PTO.

6.4.5.5.2. Set parking brake and chock wrecker.

6.4.5.5.3. Remove safety chains from towed vehicle.

6.4.5.5.4. On towed vehicle, release parking brake and place in neutral.

6.4.5.5.5. Tilt and extend flatbed according the manufacturer's recommendations.

6.4.5.5.6. Never place a person between the raised bed and frame of truck.

6.4.5.5.7. Ensure all personnel are clear.

6.4.5.5.8. Slowly winch towed vehicle off flatbed.

6.4.5.5.9. On towed vehicle, set brake and place in park (automatic transmissions).

6.4.5.5.10. Remove cable and rewind.

6.4.5.5.11. Remove cable harness, V-strap or V-chain,

6.4.5.6. Repeat loading and unloading on different types of vehicles. This will show the trainee different hook-up points and towing procedures.

6.4.5.7. Complete after-operation inspection, found later in **Section 6**.

6.4.6. Hook wreckers. Demonstrate and explain the following:

6.4.6.1. Ensure use of proper safety equipment.

6.4.6.2. Turn-on wrecker warning lights and 4-way flashers.

6.4.6.3. Show where warning triangles/flares should be placed (actually place if doing an actual wrecker run).

6.4.6.4. Attach using a tow bar (for use on larger vehicles).

6.4.6.4.1. Align wrecker to center of the disabled vehicle.

6.4.6.4.2. Use spotter when backing.

6.4.6.4.3. Reduce wrecker's engine to idle and apply parking brake.

6.4.6.4.4. Place transmission in neutral and engage PTO.

6.4.6.4.5. Adjust engine speed to desired rpm using the throttle control.

6.4.6.4.6. Lower tow bar.

6.4.6.4.7. Release spacer bar locks.

6.4.6.4.8. Demonstrate how to adjust boom.

6.4.6.4.9. Never adjust boom with a load on the tow bar.

6.4.6.4.10. Back the wrecker up to the vehicle, so tow bar is snug against bottom portion of the bumper.

6.4.6.4.11. Attach J-hook chains or regular chains to vehicle and tow bar.

6.4.6.4.11.1. J-hook on axle with hook point towards ground or secure with regular chain to axle.

6.4.6.4.11.2. Attach other end of chain to slot/hooks on tow bar.

Note: Exercise care to ensure brake lines and other items are not damaged.

6.4.6.4.12. Attach safety chain from wrecker to chassis around axle frame.

6.4.6.4.13. Apply spacer bar locks (they will lock in place as the vehicle is lifted).

6.4.6.4.14. Lift tow bar until wheels are about 12-inches off the ground.

6.4.6.4.14.1. Lift slowly.

6.4.6.4.14.2. Watch for rear overhang of vehicle.

6.4.6.4.15. Recheck all connections.

6.4.6.5. Attach using a sling tow bar (for use on smaller vehicles).

6.4.6.5.1. Align wrecker to center of the disabled vehicle.

6.4.6.5.2. Reduce wrecker's engine to idle and apply parking brake.

6.4.6.5.3. Place transmission in neutral and engage PTO.

6.4.6.5.4. Adjust engine speed to desired rpm using the throttle control.

6.4.6.5.5. Lower sling tow bar.

6.4.6.5.6. Release spacer bar locks.

6.4.6.5.7. Demonstrate how to adjust boom.

6.4.6.5.8. Never adjust boom with a load on the tow bar.

6.4.6.5.9. Back the wrecker up to the vehicle, so sling tow bar is snug against bumper (anchor bar should be slightly under vehicle).

6.4.6.5.10. Attach j-hook chains or regular chains to vehicle and tow bar.

6.4.6.5.10.1. J-hook on axle with hook point towards ground or secure with regular chain to axle.

6.4.6.5.10.2. Attach other end of chain to slot/hooks on tow bar.

6.4.6.5.10.3. Exercise care to ensure brake lines and other items are not damaged.

6.4.6.5.11. Attach safety chain from wrecker to chassis around axle frame.

6.4.6.5.12. Apply spacer bar locks. (They will lock in place as the vehicle is lifted).

6.4.6.5.13. Lift tow bar until wheels are about 12-inches off the ground.

6.4.6.5.13.1. Lift slowly.

6.4.6.5.13.2. Watch for rear overhang of vehicle.

6.4.6.5.14. Recheck all connections.

6.4.6.6. Towing the vehicle.

6.4.6.6.1. Demonstrate applying tow dolly (explain when/why they are to be used).

6.4.6.6.1.1. Drive shaft cannot be removed.

6.4.6.6.1.2. All-wheel drive/4X4.

6.4.6.6.1.3. Trailing axle/wheel is broken or damaged.

6.4.6.6.2. Retrieve warning devices. Do not handle flares if still burning or warm.

6.4.6.6.3. Disengage PTO.

6.4.6.6.4. Front end towing.

6.4.6.6.4.1. Drive shaft removed (if tow dolly is not available, recommend a vehicle mechanic remove drive shaft).

6.4.6.6.4.2. Place in neutral.

6.4.6.6.4.3. Release parking brake.

6.4.6.6.4.4. Maximum tow speed and distance.

6.4.6.6.5. Rear end towing.

6.4.6.6.5.1. Secure steering wheel.

6.4.6.6.5.2. Drive shaft removed. (If tow dolly is not available, recommend a vehicle mechanic remove drive shaft).

6.4.6.6.5.3. Place in neutral.

6.4.6.6.5.4. Maximum tow speed and distance.

6.4.6.6.6. Turn-on towed vehicle's 4-way flasher and/or attach magnetic signal lights.

6.4.6.6.7. Flat towing. (Explain when and why the flat may need to be towed).

6.4.6.7. Disconnecting from tow bar or sling tow bar.

6.4.6.7.1. Remove tow dolly (if attached).

6.4.6.7.2. Remove magnetic signal lights.

6.4.6.7.3. Engage PTO.

6.4.6.7.4. Unlock spacer bar locks.

6.4.6.7.5. Ensure all clear.

6.4.6.7.6. Lower vehicle slowly.

6.4.6.7.7. In reverse order, remove safety and tow chains.

6.4.6.7.8. Apply parking brakes and place in park (automatic transmissions) on tow vehicle.

6.4.6.7.9. Disengage PTO.

6.4.6.7.10. Move wrecker clear of towed vehicle.

6.4.6.7.11. Engage PTO.

6.4.6.7.12. Apply spacer bar locks.

6.4.6.7.13. Raise tow bar or sling tow bar.

6.4.6.7.14. Disengage PTO.

6.4.6.8. Demonstrate the following if equipped on the wrecker:

6.4.6.8.1. Split boom.

6.4.6.8.2. Outriggers.

Note: Use caution when lowering; keep feet clear.

6.4.6.8.3. Scotch block (rear wheel chocks).

6.4.6.8.4. Snatch block configurations.

6.4.6.8.4.1. Two-part line pull (one snatch block).

6.4.6.8.4.2. Three-part line pull (two snatch blocks).

6.4.6.8.5. Pintle hook.

6.4.6.8.6. Airline hook-ups (explain when they may be needed).

6.4.6.9. Repeat hook-ups on different types of vehicles.

6.4.6.10. Complete after-operation inspection, found later in **Section 6**.

6.4.7. Wheel-lift wreckers. Demonstrate and explain the following:

6.4.7.1. Ensure use of proper safety equipment.

6.4.7.2. Turn-on wrecker warning lights and 4-way flashers.

6.4.7.3. Show where warning triangles/flares should be placed.

6.4.7.4. Procedure for hook-up:

6.4.7.4.1. Align wrecker to the center of the disabled vehicle.

6.4.7.4.2. Reduce wrecker's engine to idle and apply parking brake.

6.4.7.4.3. Transmission in neutral and engage PTO.

6.4.7.4.4. Adjust engine speed to desired rpm using the throttle control.

6.4.7.4.5. Lower and extend wheel-lift according to manufacturer's recommendation.

6.4.7.4.6. Extend the wheel-lift until firmly against tires.

6.4.7.4.7. Insert tire restraint into cross tube until firmly against the rear of tire.

6.4.7.4.8. Some vehicles may require the hub caps to be removed.

6.4.7.4.9. Lock tire restraint in place.

6.4.7.4.10. Place towed vehicle in neutral and disengage parking brake.

6.4.7.4.11. Raise the vehicle to desired height.

6.4.7.4.12. Ensure adequate clearance for ground on the rear portion of towed vehicle.

6.4.7.4.13. Position safety strap over top of each tire.

6.4.7.4.14. Tighten safety strap securely with ratchet.

6.4.7.5. Tow fork adapters (if equipped).

6.4.7.6. Towing vehicle.

6.4.7.6.1. Demonstrate applying tow dolly. (Explain when/why they are to be used).

6.4.7.6.1.1. Drive shaft cannot be removed.

6.4.7.6.1.2. All-wheel drive/4X4.

6.4.7.6.1.3. Trailing axle/wheel is broken or damaged.

6.4.7.6.2. Retrieve warning devices. Do not handle flares if still burning or warm.

6.4.7.6.3. Disengage PTO.

6.4.7.6.4. Front end towing.

6.4.7.6.4.1. Drive shaft removed. (If tow dolly is not available, recommend a vehicle mechanic remove drive shaft).

6.4.7.6.4.2. Place in neutral.

6.4.7.6.4.3. Release parking brake.

6.4.7.6.4.4. Maximum tow speed and distance.

6.4.7.6.5. Rear end towing.

6.4.7.6.5.1. Secure steering wheel using provided straps, hooks, rope, or chains.

6.4.7.6.5.2. Drive shaft removed or place in neutral.

6.4.7.6.5.3. Maximum tow speed and distance.

6.4.7.6.6. Turn-on towed vehicle’s 4-way flasher and/or attach magnetic signal lights.

6.4.7.7. Disconnecting from tow bar or sling tow bar.

6.4.7.7.1. Remove tow dolly (if attached).

6.4.7.7.2. Remove magnetic signal lights.

6.4.7.7.3. Engage PTO.

6.4.7.7.4. Ensure all clear.

6.4.7.7.5. Lower vehicle slowly.

6.4.7.7.6. Apply parking brakes and place in park (automatic transmissions) on tow vehicle.

6.4.7.7.7. Remove tire straps.

6.4.7.7.8. Remove tire restraint from cross tube.

6.4.7.7.9. Disengage PTO.

6.4.7.7.10. Move wrecker clear of towed vehicle.

6.4.7.7.11. Engage PTO.

6.4.7.7.12. Raise and retract wheel-lift.

6.4.7.7.13. Disengage PTO.

6.4.7.8. Repeat hook-ups on different types of vehicles.

6.4.7.9. Complete after-operation inspection, found later in **Section 6**.

6.4.8. After-operation inspection (all wrecker types). Show trainee the after operation inspection and report.

6.4.8.1. Ensure vehicle is cleaned.

6.4.8.2. Cargo straps and chains are properly stowed.

6.4.8.3. Refuel vehicle.

6.4.8.4. Following manufacturer’s shut-down procedures.

6.4.8.5. Park.

6.4.8.5.1. Apply brakes.

6.4.8.5.2. Place transmission in neutral (park or an automatic).

6.4.8.6. Perform a walk-around inspection.

6.4.8.7. Drain air tanks.

6.4.8.8. Annotate any discrepancies found on AF Form 1800.

6.4.9. Conclude by allowing time for questions and any requested re-demonstrations.

Section 7—TRAINEE PERFORMANCE AND EVALUATION

7.1. Trainee Performance.

7.1.1. Instructor will:

7.1.1.1. Ensure safety at all times. **Note:** Stop training when safety items are violated. Proceed only when the trainee fully understands how to avoid repeating the safety infraction(s).

7.1.1.1.1. Chock wheel (if required) when wrecker is parked.

7.1.1.1.2. Remove all jewelry and identification tags.

Note: If available, mark vehicle with magnetic sign indicating “Driver-in-Training” or “Trainee Operator.”

7.1.1.2. Personal protective equipment and other items:

7.1.1.2.1. Safety steel-toed boots must be worn.

7.1.1.2.2. Gloves.

7.1.1.2.3. Reflective vest.

7.1.1.2.4. Coveralls and eye protection. (If having to reach under the vehicle for chain hook ups.

7.1.1.2.5. Hearing protection.

7.1.1.2.6. Raingear, cold weather gear, etc.

7.1.1.3. Pay particular attention to the cautions and warnings listed in the operator's manual.

7.1.1.4. Ensure trainee wears seat belts.

7.1.1.5. Properly adjust driver’s seat and all mirrors.

7.1.1.6. Wrecker safety items/procedures.

7.1.1.7. Ensure the driver is aware of driving situations he/she is to perform.

7.1.1.8. Conduct during/after-action reviews with the trainee. (Demonstration may need to be re-accomplished).

7.1.2. Trainee Performance. See **Attachment 4**.

7.1.2.1. Conduct operator maintenance (have trainee explain items being inspected).

Note: Allow trainee to use **Attachment 2** as a guide while performing inspection.

7.1.2.1.1. Pre-inspection.

7.1.2.1.2. During-inspection.

7.1.2.2. Ensure AF From 1800 is properly documented.

7.1.2.3. Practice driving wrecker without a towed vehicle.

Note: Ensure caution is taken when braking due to the absence of the weight of the vehicle.

7.1.2.3.1. Understand and explain wrecker gauges, switches, levers and buttons.

7.1.2.3.2. Establish a road course that will have the following: (if the course does not have one of the following, then the trainee should be able to explain the correct driving techniques).

7.1.2.3.2.1. Basic controls and operations.

7.1.2.3.2.1.1. Stops signs to demonstrate start/stop.

7.1.2.3.2.1.2. Proper space.

7.1.2.3.2.2. Parking.

7.1.2.3.2.3. Backing.

7.1.2.3.2.3.1. Set up cones to resemble size of a towed vehicle.

7.1.2.3.2.3.2. Using a spotter, explain hand signals and proper spotter position.

7.1.2.3.2.3.3. Continue until the student can show proficiency in operating.

7.1.2.3.2.4. Turns.

7.1.2.3.2.5. Intersections.

7.1.2.3.2.6. Urban/rural straight.

7.1.2.3.2.7. Expressway.

7.1.2.3.2.8. Stopping/starting.

7.1.2.3.2.9. Curves.

7.1.2.3.2.10. Upgrades/downgrades.

7.1.2.3.2.11. Vehicle recovery.

7.1.2.3.2.12. Recovery operations. See below.

7.1.2.3.3. Recovery Operations:

7.1.2.3.3.1. Flatbed wrecker trainee performance. Complete the following:

7.1.2.3.3.2. Load training vehicle.

7.1.2.3.3.3. Check to ensure training vehicle is secured.

7.1.2.3.3.4. Drive to drop-off point.

7.1.2.3.3.5. Unload training vehicle.

7.1.2.3.3.6. Repeat with different applicable scenarios until student is proficient at retrieving vehicles.

7.1.2.3.3.7. Perform after-operation inspection.

7.1.2.3.3.7.1. Ensure vehicle cleaned.

7.1.2.3.3.7.2. Chains are properly stowed.

7.1.2.3.3.7.3. Refueled.

7.1.2.3.3.7.4. Following manufacturer’s shut-down procedures.

7.1.2.3.3.7.4.1. Park.

7.1.2.3.3.7.4.2. Apply brakes.

7.1.2.3.3.7.4.3. Place transmission in neutral (park or an automatic).

7.1.2.3.3.7.4.4. Perform a walk-around inspection.

7.1.2.3.3.7.4.5. Drain air tanks.

7.1.2.3.3.7.4.6. Report any discrepancies found on AF Form 1800.

7.1.2.3.3.8. Hook wrecker trainee performance. Complete the following:

7.1.2.3.3.8.1. Hook-up training vehicle.

7.1.2.3.3.8.1.1. Tow bar.

7.1.2.3.3.8.1.2. Sling tow bar.

7.1.2.3.3.8.1.3. Install wheel dolly at least once and tow vehicle.

7.1.2.3.3.8.2. Ensure student has correctly and safely hooked up training vehicle.

7.1.2.3.3.8.3. Have student install wheel dolly at least once.

7.1.2.3.3.8.4. Drive wrecker through a course with the training vehicle.

7.1.2.3.3.8.5. Unhook the training vehicle.

7.1.2.3.3.8.6. Other items to perform.

7.1.2.3.3.8.6.1. Split boom.

7.1.2.3.3.8.6.2. Outriggers.

7.1.2.3.3.8.6.3. Freewheeling cable. Ensure no load is on the cable.

7.1.2.3.3.8.6.4. Snatch block recovery.

7.1.2.3.3.8.7. Repeat with different scenarios and vehicles until student is proficient at retrieving vehicles.

7.1.2.3.3.8.8. Perform after-operation inspection:

7.1.2.3.3.8.8.1. Ensure vehicle cleaned.

7.1.2.3.3.8.8.2. Chains are properly stowed.

7.1.2.3.3.8.8.3. Refueled.

7.1.2.3.3.8.8.4. Following manufacturer's shut-down procedures.

7.1.2.3.3.8.8.5. Park.

7.1.2.3.3.8.8.6. Apply brakes.

7.1.2.3.3.8.8.7. Place transmission in neutral (park or an automatic).

7.1.2.3.3.8.8.8. Drain air tanks.

7.1.2.3.3.8.8.9. Report any discrepancies found on AF Form 1800.

7.1.2.3.3.9. Wheel-lift wrecker trainee performance. Complete the following:

7.1.2.3.3.9.1. Hook-up training vehicle.

7.1.2.3.3.9.2. Ensure student has correctly and safely hooked up training vehicle.

7.1.2.3.3.9.3. Have student install wheel dolly at least once and tow the vehicle.

7.1.2.3.3.9.4. Drive wrecker through a course with the training vehicle.

7.1.2.3.3.9.5. Unhook the training vehicle.

7.1.2.3.3.9.6. Repeat with different scenarios and vehicles until student is proficient at retrieving vehicles.

7.1.2.3.3.9.7. Perform after-operation inspection:

7.1.2.3.3.9.7.1. Ensure vehicle cleaned.

7.1.2.3.3.9.7.2. Chains are properly stowed.

7.1.2.3.3.9.7.3. Refueled.

7.1.2.3.3.9.7.4. Following manufacturer's shut-down procedures.

7.1.2.3.3.9.7.5. Park.

7.1.2.3.3.9.7.6. Apply brakes.

7.1.2.3.3.9.7.7. Place transmission in neutral (park or an automatic).

7.1.2.3.3.9.7.8. Perform a walk-around inspection.

7.1.2.3.3.9.7.9. Drain air tanks.

7.1.2.3.3.9.7.10. Report any discrepancies found on AF Form 1800.

7.2. Performance Evaluation.

7.2.1. Trainee will perform performance evaluation found in **Attachment 4**.

7.2.1.1. Instructor and trainee will review **Attachment 3** and **Attachment 4**.

7.2.1.2. Instructor will answer trainee's questions.

Note: If available, mark vehicle with magnetic sign indicating "Driver-in-Training" or "Trainee Operator".

7.2.2. Instructor will:

7.2.2.1. Ensure safety at all times.

7.2.2.1.1. Place wheel chocks (if required) when wrecker is parked,

7.2.2.1.2. Remove all jewelry and identification tags.

7.2.2.2. Personal protective equipment and other items.

7.2.2.2.1. Safety steel-toed boots must be worn.

7.2.2.2.2. Gloves will be worn during cargo loading and unloading.

7.2.2.2.3. Reflective vest.

7.2.2.2.4. Coveralls and eye protection (if having to reach under the vehicle for chain hook-ups.

7.2.2.2.5. Hearing protection.

7.2.2.3. Pay particular attention to the cautions and warnings listed in the operator's manual.

7.2.2.4. Ensure trainee wears seat belts.

7.2.2.5. Properly adjust driver’s seat and all mirrors (if available).

7.2.2.6. Wrecker safety items/procedures.

7.2.3. Explain driving techniques.

7.2.4. Establish a road course that will have the following: (if the course does not have one of the following, then the trainee should be able to explain the correct driving techniques).

7.2.4.1. Basic controls and operations.

7.2.4.1.1. Stops signs to demonstrate start/stop.

7.2.4.1.2. Proper space.

7.2.4.2. Parking.

7.2.4.3. Backing.

7.2.4.3.1. Set up cones to resemble size of a towed vehicle.

7.2.4.3.2. Using a spotter, explain hand signals and proper spotter position.

7.2.4.3.3. Continue until the student can show proficiency in operating.

7.2.4.4. Turns.

7.2.4.5. Intersections.

7.2.4.6. Urban/rural straight.

7.2.4.7. Expressway.

7.2.4.8. Stopping/starting.

7.2.4.9. Curves.

7.2.4.10. Upgrades/downgrades.

7.2.4.11. Vehicle recovery.

7.2.4.12. Recovery operations.

7.2.4.12.1. (If applicable) Flatbed wrecker trainee performance. Complete the following:

7.2.4.12.1.1. Load training vehicle.

7.2.4.12.1.2. Check to ensure training vehicle is secured.

7.2.4.12.1.3. Drive to drop-off point.

7.2.4.12.1.4. Unload training vehicle.

7.2.4.12.1.5. Repeat with different applicable scenarios until student is proficient at retrieving vehicles.

7.2.4.12.2. (If applicable) Hook wrecker trainee performance. Complete the following:

7.2.4.12.2.1. Hook-up training vehicle.

7.2.4.12.2.1.1. Tow bar.

7.2.4.12.2.1.2. Sling tow bar.

7.2.4.12.2.2. Install wheel dolly at least once and tow vehicle.

7.2.4.12.2.3. Ensure student has correctly and safely hooked up training vehicle.

7.2.4.12.2.4. Have student install wheel dolly at least once.

7.2.4.12.2.5. Drive wrecker through a course with the training vehicle.

7.2.4.12.2.6. Unhook the training vehicle.

7.2.4.12.2.7. (If applicable) Other items to perform.

7.2.4.12.2.7.1. Split boom.

7.2.4.12.2.7.2. Outriggers.

7.2.4.12.2.7.3. Freewheeling cable. Ensure no load is on the cable.

7.2.4.12.2.7.4. Snatch block recovery.

7.2.4.12.2.7.5. Repeat with different scenarios and vehicles until student is proficient at retrieving vehicles.

7.2.4.12.3. (If applicable) Wheel-lift wrecker trainee performance. Complete the following:

7.2.4.12.3.1. Hook-up training vehicle.

7.2.4.12.3.2. Ensure student has correctly and safely hooked up training vehicle.

7.2.4.12.3.3. Have student install wheel dolly at least once and tow the vehicle.

7.2.4.12.3.4. Drive wrecker through a course with the training vehicle.

7.2.4.12.3.5. Unhook the training vehicle.

7.2.4.12.3.6. Repeat with different scenarios and vehicles until student is proficient at retrieving vehicles.

7.2.4.13. Perform after-operation inspection:

7.2.4.13.1. Ensure vehicle cleaned.

7.2.4.13.2. Chains are properly stowed.

7.2.4.13.3. Refueled.

7.2.4.13.4. Following manufacturer's shut-down procedures.

7.2.4.13.4.1. Park.

7.2.4.13.4.2. Apply brakes.

7.2.4.13.4.3. Place transmission in neutral (park or an automatic).

7.2.4.13.4.4. Perform a walk-around inspection.

7.2.4.13.4.5. Drain air tanks.

7.2.4.13.4.6. Report any discrepancies found on AF Form 1800.

7.2.5. Ensure the driver is aware of driving situations.

7.2.6. Conduct after-action reviews with the trainee.

7.2.7. Trainee is not allowed any instructor assists to pass performance evaluation.

7.2.8. Evaluation checklist provided in **Attachment 4**.

7.2.9. Retraining; retrain No-Go's.

7.2.9.1. Re-demonstrate "No-Go" items.

7.2.9.2. Have trainee re-perform until they show proficiency in operating, critique weaknesses as observed.

7.2.9.3. Re-evaluate.

Section 8—AIR BRAKES

8.1. Safe Operation of a CMV with an Air Brake System.

8.1.1. Safe operation of a CMV with an air brake system, requires knowledge of: Air Brake System nomenclature; the dangers of contaminated air supply; implications of severed or disconnected air lines between the power unit and the wrecker(s); implications of low air pressure readings; procedures to conduct safe and accurate pre-trip inspections; procedures for conducting en route and post-trip inspections of air actuated brake systems (ability to detect defects, which may cause the system to fail).

8.1.2. Air brakes are really three different braking systems:

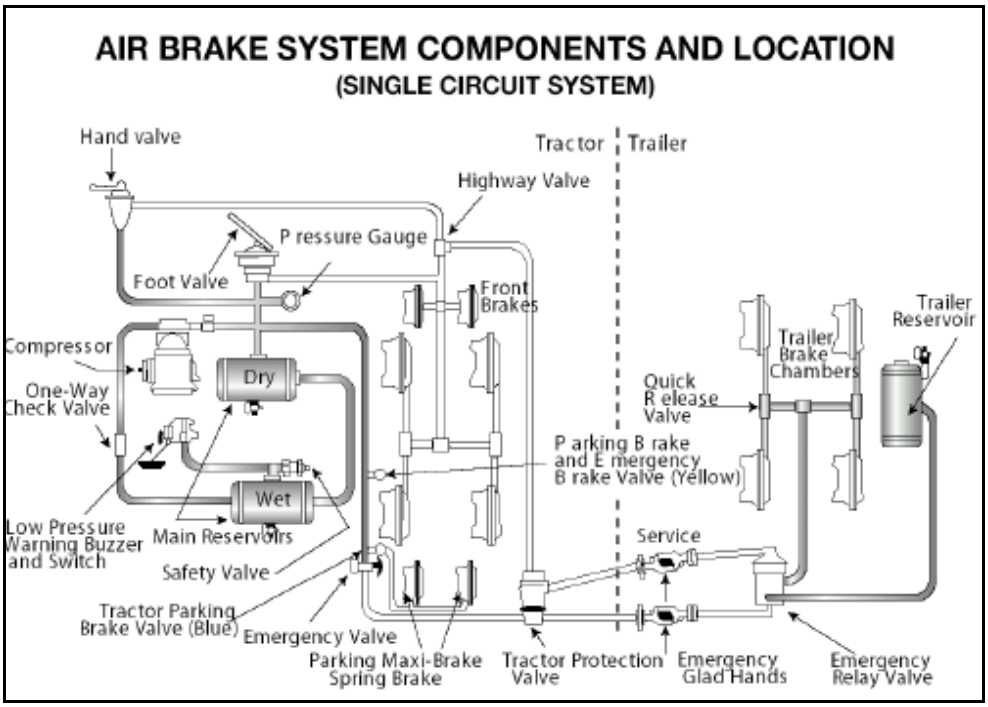
8.1.2.1.1. Service brake. Applies and releases the brakes when using the brake to pedal during normal driving.

8.1.2.1.2. Parking brake. Applies and releases the parking brakes when using the parking brake control.

8.1.2.1.3. Emergency brake. Uses part of the service and parking brake systems to stop the vehicle in the event of a brake system failure.

8.1.3. Parts of an Air Brake System:

Figure 8.1. Air Brake System Components.



8.1.3.1. Air compressor. Pumps air into the air storage tanks (reservoirs). The air compressor is connected to the engine through gears or a v-belt. The compressor may be air cooled or may be cooled by the engine cooling system. It may have its own oil supply, or be lubricated by engine oil. If the compressor has its own oil supply, check the oil level before driving.

8.1.3.2. Air compressor governor. The governor controls when the air compressor will pump air into the air storage tanks. When air tank pressure rises to the "cut-out' level (around 125 pounds per square inch or psi), the governor stops the compressor from pumping air. When the tank pressure falls to the "cut-in" pressure (around 100 psi), the governor allows the compressor to start pumping again.

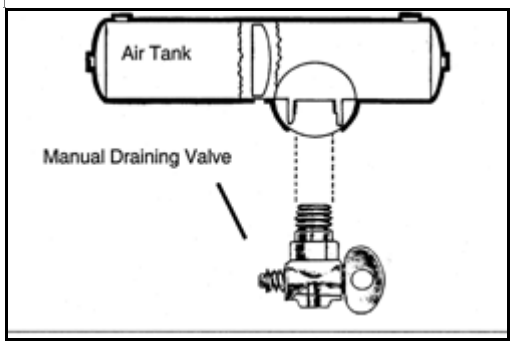
8.1.3.3. Air storage tanks. Air storage tanks are used to hold compressed air. The number and size of air tanks varies among vehicles. The tanks will hold enough air to allow the brakes to be used several times, even if the compressor stops working.

8.1.3.4. Air tank drains. Compressed air usually has some water and some compressor oil in it which is bad for the air brake system. The water can freeze in cold weather and cause brake failure. Drain the air tanks completely. Each air tank is equipped with a drain valve in the bottom. There are two types:

8.1.3.4.1. Manually operated. Turn a quarter turn or pull a cable to operate. See **Figure 8.2.** Manually drain the tank at the end of each day of driving.

8.1.3.4.2. Automatic. The water and oil is automatically expelled. They may be equipped for manual draining as well. Automatic air tanks are available with electric heating devices to help prevent freezing of the automatic drain cold weather.

Figure 8.2. Manual Drain Valve.



8.1.3.5. Alcohol evaporator. Some air brake systems have an alcohol evaporator to put alcohol into the air system. This helps to reduce the risk of ice in air brake valves and other parts during cold weather which can make the brakes stop working. Check and fill the alcohol container as necessary, every day during cold weather.

8.1.3.6. Safety valve. A safety relief valve is installed in the first tank the air compressor pumps air to. The safety valve protects the tank and the rest of the system from too much pressure. The valve is usually set to open at 150 psi. If the safety valve releases air, something is wrong.

8.1.3.7. The brake pedal. Put on the brakes by pushing down the brake pedal. (It is also called the foot valve or treadle valve.)

8.1.3.7.1. Pushing the pedal down harder applies more air pressure. Letting up on the brake pedal reduces the air pressure and releases the brakes. Releasing the brakes lets some compressed air go out of the system, so the air pressure in the tanks is reduced.

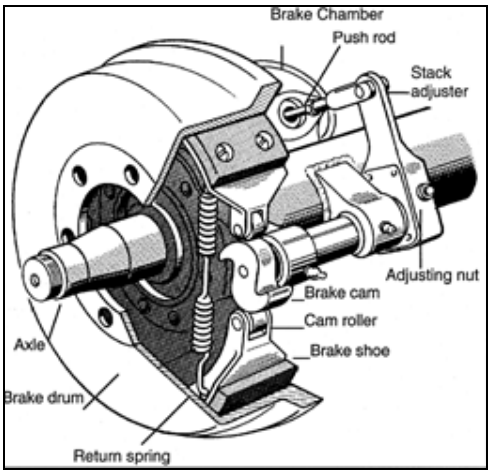
8.1.3.7.2. It must be made up by the air compressor. Pressing and releasing the pedal unnecessarily can let air out faster than the compressor can replace it. If the pressure gets too low, the brakes won't work.

8.1.4. Foundation brakes. Used at each wheel. The most common type is the s-cam drum brake, shown in **Figure 8.3.** Its parts include:

8.1.4.1. Brake drums, shoes, and linings. Located on each end of the vehicle's axles. The wheels are bolted to the drums. The braking mechanism is inside the drum. To stop, the brake shoes and linings are pushed against the inside of the drum. This causes friction, which slows the vehicle (and creates heat). The heat a drum can take without damage depends on how hard and how long the brakes are used. Too much heat can make the brakes stop working.

8.1.4.2. S-cam brakes. When pushing the brake pedal, air is let into each brake chamber Air pressure pushes the rod out, moving the slack adjuster, thus twisting the brake camshaft. This turns the s-cam (so called because it is shaped like the letter "S"). The s-cam forces the brake shoes away from one another and presses them against the inside of the brake drum. When releasing the brake pedal, the s-cam rotates back and a spring pulls the brake shoes away from the drum, letting the wheels roll freely again.

Figure 8.3. S-cam Air Brakes.



8.1.4.3. Wedge brakes. The brake chamber push rod pushes a wedge directly between the ends of two brake shoes. This shoves them apart and against the inside of the brake drum. Wedge brakes may have a single brake chamber, or two brake chambers, pushing wedges in at both ends of the brake shoes. Wedge type brakes may be self-adjusting or may require manual adjustment.

8.1.4.4. Disc brakes. In air-operated disc brakes, air pressure acts on a brake chamber and slack adjuster, like s-cam brakes. But instead of the s-cam, a "power screw" is used. The pressure of the brake chamber on the slack adjuster turns the power screw. The power screw clamps the disc or rotor between the brake lining pads of a caliper, similar to a large c-clamp.

8.1.5. Supply pressure gauges. All air-braked vehicles have a pressure gauge connected to the air tank. If the vehicle has a dual air brake system, there will be a gauge for each half of the system. (Or a single gauge with two needles.) Dual systems will be discussed later. These gauges tell how much pressure is in the air tanks.

8.1.6. Application pressure gauge. This gauge shows how much air pressure is being applied to the brakes. (This gauge is not on all vehicles.) Increasing application pressure to hold the same speed means the brakes are fading. The operator should slow down and use a lower gear. The need for increased pressure can also be caused by brakes out of adjustment, air leaks, or mechanical problems.

8.1.7. Low air pressure warning. A low air pressure warning signal is required on vehicles with air brakes. A warning signal that can be seen must come on before the air pressure in the tanks falls below 60 psi. (Or one half the compressor governor cutout pressure on older vehicles.) The warning is usually a red light. A buzzer may also come on.

8.1.7.1. Another type of warning is the "wig wag." This device drops a mechanical arm into the view when the pressure in the system drops below 60 psi. An automatic wig wag will rise out of the view when the pressure in the system goes above 60 psi. The manual reset type must be placed in the "out of view" position manually. It will not stay in place until the pressure in the system is above 60 psi.

8.1.8. Stop light switch. Warns drivers behind the vehicle, who must be warned when the brakes are put on. The air brake system does this with an electric switch that works by air pressure. The switch turns on the brake lights when the air brakes are put on.

8.1.9. Front brake limiting valve. Some older vehicles (made before 1975) have a front brake limiting valve and a control in the cab. The control is usually marked "normal" and "slippery." When control is put in the "slippery" position, the limiting valve cuts the "normal" air pressure to the front brakes by half.

8.1.9.1. Limiting valves were used to reduce the chance of the front wheels skidding on slippery surfaces. However, they actually reduce the stopping power of the vehicle.

8.1.9.2. Front wheel braking is good under all conditions. Tests have shown front wheel skids from braking are not likely, even on ice. Make sure the control is in the "normal" position to have normal stopping power.

8.1.9.3. Many vehicles have automatic front wheel limiting valves. They reduce the air to the front brakes except when the brakes are put on very hard (60 psi or more application pressure). These valves cannot be controlled by the driver.

8.1.10. Spring brakes. Tractor and straight truck spring brakes will come fully on when air pressure drops to a range of 20 to 45 psi (typically 20 to 30 psi). Do not wait for the brakes to come on automatically. When the low air pressure warning light and buzzer first come on, bring the vehicle to a safe stop right away, while the brakes can be controlled. Brakes must be properly adjusted to work correctly and to prevent the braking power from being affected.

8.1.11. Parking brake controls. In newer vehicles with air brakes, put on the parking brakes using a diamond-shaped, yellow, push-pull control knob. Pull the knob out to put the parking brakes (spring brakes) on, and push it in to release them. On older vehicles, the parking brakes may be controlled by a lever. Use the parking brakes whenever the vehicle is being parked. **Note:** Never push the brake pedal down when the spring brakes are on. The brakes could be damaged by the combined forces of the springs and the pressure.

8.1.11.1. Modulating control valves. A control handle on the dash board found in some vehicles that may be used to apply the spring brakes gradually. It is spring loaded, so there is feel for the braking action. The more the operator moves the control lever, the harder the spring brakes come on, so that the operator can control the spring brakes if the service brakes fail. When parking a vehicle with a modulating control valve, move the lever as far as it will go and hold it in place with the locking device.

8.1.11.2. Dual parking control valves. A dual valve is used when main air pressure is lost to release the spring brakes, so the operator can move the vehicle in an emergency. A push-pull type valve used to put the spring brakes for parking, and a spring loaded valve in the "out" position. When the operator pushes the control in, air from the separate air tank releases the spring brakes so the vehicle can move. When the operator releases the button, the spring brakes come on again. There is only enough air in the separate tank to do this a few times. The operator needs to plan carefully when moving, or he/she may be stopped in a dangerous location when the separate air supply runs out.

8.1.11.3. Antilock Braking System (ABS). Truck tractors with air brakes built on or after March 1, 1997, and other air brakes vehicles, (trucks, buses, trailers, and converter dollies) built on or after March 1, 1998, are required to be equipped with antilock brakes. ABS is a computerized system that keeps the wheels from locking up during hard brake applications. .

8.1.11.3.1. On newer vehicles, the malfunction lamp comes on at start-up for a bulb check, and then goes out quickly. On an older system, the lamp could stay on until the vehicle is driving over 5 mph.

8.1.11.3.2. If the lamp stays on after the bulb check, or goes on once the vehicle is under way, it may have lost ABS control at one or more wheels.

8.1.11.3.3. ABS is in addition to the normal brakes. It does not decrease or increase the normal braking capability. It only activates when wheels are about to lock up.

8.1.12. Dual air brakes. Two separate air brake systems which use a single set of brake controls. Each system has its own air tanks, hoses, lines, etc. Both systems supply air to the wrecker (if there is one).

8.1.12.1. One system (the "Primary") typically operates regular brakes on rear axle or axles.

8.1.12.2. The other system (the "Secondary") operates regular brakes on front axle (and possibly one rear axle).

8.1.12.3. Before driving a vehicle, allow time for the air compressor to build up a minimum of 100 psi pressure in both the primary and secondary systems, or to the recommended psi in the Manufacturer's Operator's Manual.

Note: Pay attention to the low air pressure warning light and buzzer. Never operate if the warning light or buzzer is on (typically when the air pressure drops below 60 psi). Bring the vehicle to a stop right away and safely park the vehicle if this happens while driving.

8.1.13. Inspecting air brakes, the following are added items to be included in Step 2 "Engine Compartment Checks", Step 5 "Walk-Around Inspecting", and Step 7 "Final Air Brake Check" of the Seven-Step Inspection Process. See **Attachment 4**. **Note:** If any of the below tests fail, they must reported to VCO, the supervisor, and or vehicle maintenance:

8.2. Using Air Brakes.

8.2.1. Normal stops. Push the brake pedal down. Control the pressure so the vehicle comes to a smooth, safe stop. If the vehicle has a manual transmission, do not push the clutch in until the engine rpm is down close to idle. When stopped, select a starting gear.

8.2.2. Emergency stops. When stopping in an emergency situation, brake in a way that will keep the vehicle in a straight line and allow to turn if it becomes necessary. Controlled or stab braking methods can be used. **Note:** If driving a vehicle with anti-lock brakes, read and follow the directions found in the owner's manual for stopping quickly:

8.2.2.1. Controlled braking:

8.2.2.1.1. Apply the brakes as hard as can be done without locking the wheels.

8.2.2.1.2. Keep steering wheel movements very small while doing this.

8.2.2.1.3. Release the brakes if needed to make a larger steering adjustment or if the wheels lock, and reapply the brakes as soon as possible.

8.2.2.2. Stab braking:

8.2.2.2.1. Apply the brakes all the way.

8.2.2.2.2. Release brakes when wheels lock up.

8.2.2.2.3. As soon as the wheels start rolling, apply the brakes fully again.

8.2.3. Stopping distance. The total stopping distance for vehicles with air brake systems is made up of four different factors:

Perception Distance
+ Reaction Distance
+ Brake Lag Distance
<u>+ Effective Braking Distance</u>
= Total Stopping Distance

8.2.4. Brake fading or failure:

8.2.4.1. Brakes can fade or fail from excessive heat caused by using them too much and not relying on the engine braking effect. Excessive heat causes chemical changes in the brake lining which reduces friction and causes expansion of the brake drums.

8.2.4.2. Brake fade is also affected by adjustment. Brakes out of adjustment will not be able to share the workload with brakes that are properly adjusted, causing the other brakes to overheat and fade from overuse.

8.2.5. Proper Braking Technique. Once the vehicle is in the proper low gear, follow the proper braking technique: **Note:** The use of brakes on along and/or steep downgrade is only a supplement to the braking effect of the engine.

8.2.5.1. Apply the brakes just hard enough to feel a definite slowdown.

8.2.5.2. When the speed has been reduced to approximately 5 mph below the "safe" speed, release the brakes (for appx. 3 seconds).

8.2.5.3. When the speed has increased to the "safe" speed, repeat the above.

8.2.6. Low Air Pressure:

8.2.6.1. If the low air pressure warning comes on, stop and safely park the vehicle as soon as possible.

8.2.6.2. Spring brakes will come on when the air pressure drops into the range of 20 to 45 psi.

8.2.7. Parking Brakes. To use the parking brake, pull the parking brake control knob out. The control will be a yellow, diamond shaped knob labeled “parking brakes” on newer vehicles. On older vehicles, it may be a round blue knob or some other shape (including a lever that swings from side to side or up and down). **Note:** Never leave the vehicle unattended without applying the parking brakes or chock the wheels. The vehicle might roll away and cause injury and damage.

8.2.7.1. Do not use the parking brakes if the brakes are very hot or they can be damaged (e.g. from just coming down a steep grade). Let hot brakes cool before using the parking brakes.

8.2.7.2. Do not use the parking brakes if the brakes are very wet in freezing temperatures (vehicle will not be able to move if they freeze). Use wheel chocks to hold the vehicle. If brakes are wet, use the brakes lightly while driving in a low gear to heat and dry them.

8.2.7.3. If the vehicle does not have automatic air tank drains, drain air tanks to remove the moisture and oil.

8.2.8. Safety Reminders.

8.2.8.1. ABS will not prevent power or turning skids.

8.2.8.2. ABS will not increase or decrease ultimate stopping power.

8.2.8.3. ABS will not necessarily shorten stopping distance.

8.2.8.4. ABS will not change the way the vehicle normally brakes.

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFI 13-213, *Airfield Driving*, 1 June 2011

AFI 24-301, *Ground Transportation*, 1 November 2018

AFMAN 24-306, *Operation of Air Force Government Motor Vehicles*, 9 December 2016

Adopted Forms

AF Form 171, *Request for Driver's Training and Addition to U.S. Government Driver's License*, 1 November 2018

AF Form 847, *Recommendation for Change of Publication*, 22 September 2009

AF Form 1800, *Operator's Inspection Guide and Trouble Report*, 1 April 2010

Abbreviations and Acronyms

ABS—Antilock Brake System

AF—Air Force

AFI—Air Force Instruction

AFIMSC—Air Force Installation Mission Support Center

AFMAN—Air Force Manual

AFQTP—Air Force Qualification Training Package

GAWR—Gross Axle Weight Rating

GCWR—Gross Combination Weight Rating

GMV—Government Motor Vehicle

GVWR—Gross Vehicle Weight Rating

GVW—Gross Vehicle Weight

IAW—In Accordance With

MPH—Miles per Hour

PTO—Power Take-off

RM—Risk Management

RPM—Revolutions per Minute

TO—Technical Order

VCO—Vehicle Control Official

Attachment 2

WRECKER INSPECTION GUIDE

GENERAL

STEP 1. VEHICLE OVERVIEW

- ☐ Paperwork
  - AF Form 1800
  - Discrepancy Correction Complete (VM Annotation)
- ☐ Vehicle Approach
  - Damage
  - Vehicle Leaning
  - Fresh Leakage of Fluids
  - Hazards Surrounding Vehicle

INTERNAL

STEP 2. ENGINE COMPARTMENT

- ☐ Leaks/hoses/Electrical Wiring Insulation
- ☐ Oil Level
- ☐ Coolant Level
- ☐ Power Steering Fluid
- ☐ Windshield Washer Fluid
- ☐ Battery Fluid Level, Connections & Tie-downs
- ☐ Automatic Transmission Fluid Level
- ☐ Hydraulic Fluid
- ☐ Engine Compartment Belts

STEP 3. ENGINE START/CAB CHECK (LEFT/FRONT/RIGHT)

- ☐ Safe Start
- ☐ Gauges
  - Hour Meter
  - Oil Pressure Gauge
  - Air Pressure Gauge
  - Temperature Gauge (Coolant/Engine Oil/Transmission Oil)
  - Ammeter/Voltmeter
- ☐ Warning Lights & Buzzers
- ☐ Mirrors & Windshield
- ☐ Wipers/Washers
- ☐ Back-up Warning Buzzer

☐ Emergency & Safety Equipment

- Spare Electrical Fuses
- First Aid Kit
- Towed Vehicle Light Attachments
- Tool Box
- Binders
- Chains
- Snatch Block
- Chains
- Red Reflective Triangles
- 6 Fuses or 3 Liquid Burning Flares
- Properly Charged & Rated Fire Extinguisher
- Optional (Chains/Tire Changing Equip, Emergency Phone List)

☐ **3B** – Lights/Reflectors/Reflector Tape Condition (Front/Sides/Rear)
(Dash Indicators for:)

- Left Turn Signal
- Right Turn Signal
- Four-Way Emergency Flashers
- High Beam Headlight
- ABS Indicator
- Clearance Lights

(Reflective Clean & Functional Light & Reflector Checks Include:)

- Headlights
- Taillights
- Spot Lights
- Turn Signals
- Four-Way Flashers
- Warning Lights (Beacons)
- Clearance Lights
- Work Area Illumination Lights
- Red Reflectors & Amber Reflectors
- Reflective Tape Condition

☐ Horn
☐ Heater/Defroster
☐ Brakes

- Parking Brake Check
- Hydraulic Brake Check
- Air Brake (Reference Section/Attachment) Check
- Service Brake Check
- Safety Belt

(TURN-OFF ENGINE/TURN-ON HEADLIGHTS *LOW BEAM* AND FOUR-WAY FLASHERS)

STEP 4. WALK-AROUND INSPECTION

☐ **4A** – Steering
- Steering Box/Hoses
- Steering Linkages

☐ **4B** – Suspension
- Springs/Air/Torque
- Mounts
- Shock Absorbers

☐ **4C** – Brakes
- Slack Adjustors & Pushrods
- Brake Chambers
- Brake Hoses/Lines
- Drum Brake
- Brake Linings

☐ **4D** – Wheels
- Rims
- Tires
- Hub Oil Seals/Axle Seals
- Lug Nuts
- Spacers & Budd Spacing

SIDE OF VEHICLE

☐ **4E** – Doors
☐ **4E** – Mirrors
☐ **4E** – Fuel Tank
☐ **4E** – Battery Box
☐ **4E** – Hydraulic Lift Controls
☐ **4E** – Stairs

UNDER VEHICLE

☐ **4F** – Drive Shaft
☐ **4F** – Exhaust
☐ **4F** – Frame

REAR OF WRECKER

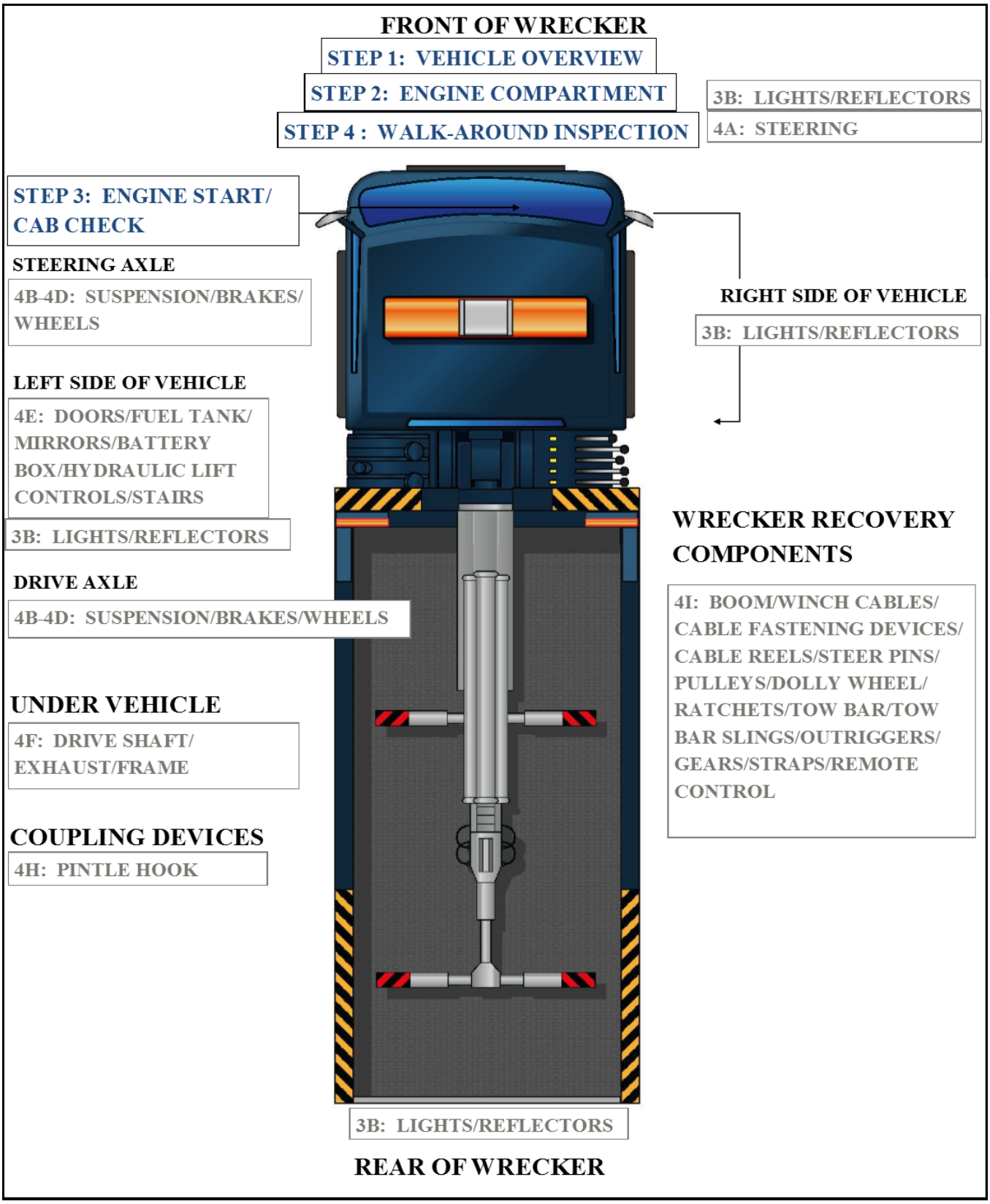
COUPLING DEVICES (WRECKER)

☐ **4H** – Air/Electrical Lines
☐ **4H** – Catwalk/Steps
☐ **4H** – Mounting Bolts
☐ **4H** – Hitch Release Lever
☐ **4H** – Locking Jaws
☐ **4H** – 5^{th} Wheel Skid Plate
☐ **4H** – Platform (5^{th} Wheel)
☐ **4H** – Kingpin/Apron/Gap
☐ **4H** – Sliding Pintle
☐ **4H** – Tongue of Draw Bar
☐ **4H** – Tongue Storage Area

WRECKER RECOVERY COMPONENTS

- ☐ **4I** – Boom
- ☐ **4I** – Winch Cables
- ☐ **4I** – Cable Fastening Devices
- ☐ **4I** – Cable Reels
- ☐ **4I** – Steer Pins
- ☐ **4I** – Pulleys
- ☐ **4I** – Dolly Wheel Ratchets
- ☐ **4I** – Tow Bar
- ☐ **4I** – Tow Bar Slings
- ☐ **4I** – Outriggers
- ☐ **4I** – Pintle Hook (if equipped)
- ☐ **4I** – Gears
- ☐ **4I** – Straps
- ☐ **4I** – Remote Control

Figure A2.1. Wrecker Inspection Guide.



Attachment 3

PERFORMANCE TEST

A3.1. Desired Learning Outcome.

A3.1.1. Understand the safety precautions to be followed before-, during-, and after-operation of the wrecker.

A3.1.2. Understand the purpose of the wrecker and their role in the mission.

A3.1.3. Know the proper operator maintenance procedures of the wrecker, IAW applicable technical orders and use of Air Force (AF) Form 1800.

A3.1.4. Safely and proficiently operate the wrecker.

A3.2. Instructions. Before beginning the performance test, the trainer will brief the trainee on the scenario that will need to be accomplished. He/she will be given additional directions and instructions as needed throughout the scenario.

A3.3. Scoring.

A3.3.1. The trainer examiner will be scoring the trainee on wrecker operations and also the general safe driving practices. The examiner will give directions and instructions to the trainee in sufficient time for him/her to execute a driving maneuver. They will not be asked to drive in an unsafe manner.

A3.3.2. The examiner will be making various marks on the performance test checklist. This does not necessarily mean anything has been done wrong. It is in the best interest to concentrate on the operation of the wrecker. The trainer will explain the test results at the conclusion of the performance test.

A3.3.3. Tasks being graded are listed on the following page; the trainee will be required to successfully pass all items.

A3.3.4. The instructor will stop the test at any time safe operations are not being followed or as deemed necessary for safety concerns.

Figure A3.1. Performance Test Checklist:

PERFORMANCE TEST			
Trainees Name:		**Date:**	
Event	**Go**	**No Go**	**Notes**
1. PRE, DURING, AND POST- OPERATION INSPECTION			
1.1. Operator has required Personal Protective Equipment.			
1.2. Follows general pattern of pre-trip checklist.			
1.3. Performs brake component check			
1.4. Signs AF Form 1800 to signify accomplishment of complete inspection.			
1.5. Cleans windshield, windows, mirrors, lights and reflectors			
1.6. Continues during operations inspection checks.			
1.7. Knows use of jacks, tools, emergency devices, tire chains, fire extinguishers, etc.			
1.8. Performs post trip inspection and reports malfunctions to Vehicle Management.			
Event	**Go**	**No Go**	**Notes**
2. BASIC CONTROL AND HIGWAY/EXPRESSWAY OPERATION			
2.1. Safety belt is used; obeys all traffic signs, signals, and laws; completes test without an accident or moving violation.			
2.2. Avoids jerky starts and stops.			
2.3. Does not cut corners sharply.			
2.4. Maintains proper speed and space.			
2.5. Ensure proper wrecker safety practices. List safety violations.			
2.6. Turns - checks traffic in all directions; uses turn signals and safely get into the lane needed for the turn; slows down smoothly, changes gears as needed to keep power; checks mirrors to ensure proper clearance; vehicle should not move into oncoming traffic.			

2.7. Intersections - checks traffic in all directions; decelerate gently, brakes smoothly and, if necessary, changes gears; if necessary, comes to a complete stop (no coasting) behind any stop signs, signals, sidewalks, or stop lines.			
2.8. Urban/Rural Straight - makes regular traffic checks and maintains a safe following distance; makes necessary traffic checks, uses proper signals, safely and smoothly changes lanes.			
2.9. Expressway - checks traffic, uses proper signals; merges smoothly into the proper lane of traffic; maintains proper lane positioning, vehicle spacing, and vehicle speed; continue to check traffic thoroughly in all directions; exits using proper signals, decelerates smoothly.			
2.10. Stopping - decelerates smoothly, brakes evenly, changes gears as necessary; brings vehicle to a full stop without coasting.			
2.11. Starting - checks traffic, avoids jerky starts.			
2.12. Curves - before entering the curve, reduces speed and is in proper gear; keeps vehicle in the lane; continues checking traffic in all directions.			
2.13. Upgrade - selects proper gear to maintain speed and does not lug the engine; checks traffic in all directions and moves to the right-most or curb lane; if legal to do so, uses four-way flashers if traveling too slowly for the flow of traffic.			
2.14. Downgrade - downshifts as needed to help control engine speed and test brakes; does not ride the clutch, race the engine, change gears, or coast.			

Event	Go	No Go	Notes
3. KNOWLEDGE OF VEHICLE AND USE OF CONTROLS			
3.1. Engine:			
Uses proper starting procedures			
Allows proper warm-up.			
Understands all gauges.			
Uses proper shutdown procedures.			
Basic knowledge of engines.			
3.2. Clutch and Transmission.			
Understands proper clutching techniques.			
Uses clutch properly through all gears.			
Shifts smoothly.			
Time shifts properly.			
Avoids riding the clutch.			
Proper use of tachometer and shifting range.			
Avoids bumping the governor.			
3.3. Brakes and Braking Techniques			
Understands the principles of an air brake system.			
Knows proper use of the protection valve.			
Knows proper use of the hand valve.			
Understands the low air warning.			
Uses proper techniques on downgrades.			
Understands the principle of front wheel limiting switch.			
Proper use of parking brake.			
Ensures air tank is at full tank pressure prior to moving the vehicle.			
Performs brake check before pulling out.			

Event	Go	No Go	Notes
4. VEHICLE RECOVERY AND RECOVERY OPERATIONS (IF VEHICLE IS EQUIPPED)			
4.1. Backing.			
Positions properly.			
Inspects before backing.			
Post guide before backing and uses spotters properly.			
Uses mirrors properly.			
Avoids blind side backing.			
Controls speed.			
4.2. Parking.			
Checks traffic position before parking.			
Parks legally and safely.			
Pulls completely off pavement when possible.			
Knows proper use of emergency warning devices.			
Uses emergency warning devices.			
4.3. Vehicle Recovery.			
Spotter. Requests spotter. Understands spotter's directions; keeps spotter in sight at all times.			
Is aware of the recovery scene and exercises positive control to prevent hazards.			
Properly engages/disengages PTO and sets proper engine speed with throttle.			
Warning lights are on, set parking brake and chock wheel as necessary.			
Properly hooks-up vehicle to be towed.			
(Flatbed wrecker). Properly winches vehicle onto the bed.			
(Flatbed wrecker). Secures vehicle to bed of wrecker.			
(Hook and wheel-lift wreckers). Uses two safety chains.			
(Hook and wheel-lift wreckers). Properly attaches tow dolly, if equipped.			

(Hook and wheel-lift wreckers). Towed vehicle 4-way flasher or mounts warning lights on the towed vehicle, parking brake released, in neutral, steering wheel secured (if towed from the rear).			
Properly unhooks or unloads towed vehicle.			
4.4. Recovery Operations.			
Proper use of snatch blocks.			
Proper use of split boom and outriggers.			
CERTIFIER COMMENTS:			

Attachment 4

SEVEN-STEP INSPECTION PROCESS

Figure A4.1. Seven-Step Inspection Process.

Seven-Step Inspection Process	
Step	**Procedure**
1. Vehicle Overview	• Review the AF Form 1800. o Ensure any discrepancy has been corrected. o Vehicle Management annotated the discrepancy was completed. o Approaching the vehicle. ▪ Damage or vehicle leaning to one side. ▪ Fresh leakage of fluids. ▪ Hazards around vehicle.
2. Check Engine Compartment	• **Note:** Check that the parking brakes are on and/or wheels chocked. The operator may have to raise the hood, tilt the cab (secure loose things so they don't fall and break something), or open the engine compartment door. • Check the following: o Engine oil level. o Coolant level in radiator; condition of hoses. o Power steering fluid level; hose condition (if so equipped). o Windshield washer fluid level. o Battery fluid level, connections and tie-downs (battery may be located elsewhere). o Automatic transmission fluid level (may require engine to be running). o Check belts for tightness and excessive wear (alternator, water pump, air compressor)--learn how much "give" the belts should have when adjusted right.

	o Leaks in the engine compartment (fuel, coolant, oil, power steering fluid, hydraulic fluid, battery fluid). Cracked, worn electrical wiring insulation.
3. Start Engine and Inspect Inside the Cab (Get in and Start Engine)	• Make sure parking brake is on. • Put gearshift in neutral (or park if automatic). Start engine; listen for unusual noises. • If equipped, check the Anti-lock Braking System (ABS) indicator lights. Light on dash should come on and then turn-off. If it stays on the ABS is not working properly. • Look at the gauges. o Oil pressure. Should come up to normal within seconds after engine is started. o Air pressure. Pressure should build from 50 to 90 psi within 3 minutes. Build air pressure to governor cut-out (usually around 120 – 140 psi. Know the vehicle's requirements. o Ammeter and/or voltmeter. Should be in normal range(s). o Coolant temperature. Should begin gradual rise to normal operating range. o Engine oil temperature. Should begin gradual rise to normal operating range. o Warning lights and buzzers. Oil, coolant, charging circuit warning, and antilock brake system lights should go out right away. o Check Condition of Controls. Check all of the following for looseness, sticking, damage, or improper setting: ▪ Steering wheel. ▪ Clutch. ▪ Accelerator (gas pedal). ▪ Brake controls. ▪ Foot brake. ▪ Trailer brake (if vehicle has one). ▪ Parking brake.

	▪ Retarder controls (if vehicle has them). ▪ Transmission controls. ▪ Interaxle differential lock (if vehicle has one). ▪ Horn(s). ▪ Windshield wiper/washer. ▪ Lights. ▪ Headlights. ▪ Dimmer switch. ▪ Turn signal. ▪ Four-way flashers. ▪ Parking – clearance – identification – marker switch (switches). • Check mirrors and windshield. o Inspect mirrors and windshield for cracks, dirt, illegal stickers, or other obstructions to seeing clearly. Clean and adjust as necessary. • Check emergency equipment. o Check for safety equipment: ▪ Spare electrical fuses (unless vehicle has circuit breakers). ▪ Three red reflective triangles, 6 fuses or 3 liquid burning flares. ▪ Properly charged and rated fire extinguisher. Check for optional items such as: ▪ Chains (where winter conditions require). ▪ Tire changing equipment. ▪ List of emergency phone numbers Accident reporting kit (packet). o Check safety belt. Check that the safety belt is securely mounted, adjusts; latches properly and is not ripped or frayed.
4. Turn-off Engine	• Make sure the parking brake is set, turn-off the engine, and take the key with. • Turn-on headlights (low beams) and four-way emergency flashers, and get out of the vehicle.

5. Do Walk-Around Inspection	• General. o Go to front of vehicle and check that low beams are on and both of the four-way flashers are working. o Push dimmer switch and check that high beams work. o Turn-off headlights and four-way emergency flashers. o Turn-on parking, clearance, side-marker, and identification lights. o Turn-on right turn signal, and start walk-around inspection. o Walk around and inspect. ▪ Clean all lights, reflectors, and glass as while doing the walk-around inspection. • Left front side. o Driver's door glass should be clean. o Door latches or locks should work properly. • Left front wheel. o Condition of wheel and rim--missing, bent, broken studs, clamps, lugs, or any signs of misalignment. o Condition of tires--properly inflated, valve stem and cap OK, no serious cuts, bulges, or tread wear. o Use wrench to test rust-streaked lug nuts, indicating looseness. o Hub oil level OK, no leaks. Left front suspension. o Condition of spring, spring hangers, shackles, o U-bolts. o Shock absorber condition. • Left front brake. o Condition of brake drum or disc. o Condition of hoses. • Front. o Condition of front axle. Condition of steering system. o No loose, worn, bent, damaged or missing parts. o Mustgrab steering mechanism to test for looseness. o Condition of windshield.

	o Check for damage and clean if dirty. o Check windshield wiper arms for proper spring tension. o Check wiper blades for damage, "stiff" rubber, and securement. o Lights and reflectors. o Parking, clearance, and identification lights clean, operating, and proper color (amber at front). o Reflectors clean and proper color (amber at front). o Right front turn signal light clean, operating, and proper color (amber or white on signals facing forward). • Right side o Right front: check all items as done on left front. o Primary and secondary safety cab locks engaged (if cab-over-engine design). o Right fuel tank(s). o Securely mounted, not damaged, or leaking. Fuel crossover line secure. o Tank(s) contain enough fuel. Cap(s) on and secure. o Condition of visible parts. Rear of engine--not leaking. Transmission--not leaking. o Exhaust system--secure, not leaking, not touching wires, fuel, or air-lines. o Frame and cross members--no bends or cracks. o Air-lines and electrical wiring--secured against snagging, rubbing, wearing. o Spare tire carrier or rack not damaged (if so equipped). o Spare tire and/or wheel securely mounted in rack. o Spare tire and wheel adequate (proper size, properly inflated). o Cargo securement (trucks). o Cargo properly blocked, braced, tied, chained, etc. Header board adequate, secure (if required).

	o Side boards, stakes strong enough, free of damage, properly set in place (if so equipped). o Canvas or tarp (if required) properly secured to prevent tearing, billowing, or blocking of mirrors. o If oversize, all required signs (flags, lamps, and reflectors) safely and properly mounted and all required permits in driver's possession. o Curbside cargo compartment doors in good condition, securely closed, latched/locked and required security seals in place. • Right rear. o Condition of wheels and rims--no missing, bent, or broken spacers, studs, clamps, or lugs. o Condition of tires--properly inflated, valve stems and caps OK, no serious cuts, bulges, tread wear, tires not rubbing each other, and nothing stuck between them. o Tires same type, e.g., not mixed radial and bias types. o Tires evenly matched (same sizes). Wheel bearing/seals not leaking. o Suspension. o Condition of spring(s), spring hangers, shackles, and u-bolts. o Axle secure. o Powered axle(s) not leaking lube (gear oil). Condition of torque rod arms, bushings. o Condition of shock absorber(s). o If retractable axle equipped, check condition of lift mechanism. If air powered, check for leaks. o Condition of air ride components. o Brakes. o Brake adjustment. o Condition of brake drum(s) or discs. o Condition of hoses--look for any wear due to rubbing. o Lights and reflectors.

	o Side-marker lights clean, operating, and proper color (red at rear, others amber). o Side-marker reflectors clean and proper color (red at rear, others amber). • Rear. o Lights and reflectors. o Rear clearance and identification lights clean, operating, and proper color (red at rear). o Reflectors clean and proper color (red at rear). o Taillights clean, operating, and proper color (red at rear). o Right rear turn signal operating, and proper color (red, yellow, or amber at rear). o License plate(s) present, clean, and secured. o Splash guards present, not damaged, properly fastened, not dragging on ground, or rubbing tires. o End gates free of damage, properly secured in stake sockets. o Rear doors securely closed, latched/locked. • Left side. o Check all items as done on right side, plus: o Battery (batteries) (if not mounted in engine compartment). o Battery box (boxes) securely mounted to vehicle. Box has secure cover. o Battery (batteries) secured against movement. Battery (batteries) not broken or leaking. o Fluid in battery (batteries) at proper level (except maintenance-free type). o Cell caps present and securely tightened (except maintenance-free type). o Vents in cell caps free of foreign material (except maintenance-free type).

6. Check Signal Lights	• Get in and turn-off all lights. • Turn-on stop lights (apply trailer hand brake or have a helper put on the brake pedal). • Turn-on left turn signal lights. • Get out and check lights. • Left front turn signal light clean, operating and proper color (amber or white on signals facing the front). • Left rear turn signal light and both stop lights clean operating, and proper color (red, yellow, or amber). • Get in vehicle. o Turn-off lights not needed for driving. o Check for all required papers, trip manifests, permits, etc. o Secure all loose articles in cab (they might interfere with operation of the controls or hit the operator in a crash). o Start the engine.
7. Start the Engine and Check Test for Hydraulic Leaks	• Test for hydraulic leaks. o If the vehicle has hydraulic brakes, pump the brake pedal three times. o Then apply firm pressure to the pedal and hold for five seconds. o The pedal should not move. If it does, there may be a leak or other problem. • Brake system. • Test parking brake. o Fasten safety belt. o Set parking brake (power unit only). Place vehicle into a low gear. o Gently pull forward against parking brake to make sure the parking brake holds. o If it doesn't hold vehicle, it is faulty; get it fixed. • Test service brake stopping action. o Go about 5 miles per hour. o Push brake pedal firmly. o "Pulling" to one side or the other can mean brake trouble.

	o Any unusual brake pedal "feel" or delayed stopping action can mean trouble. o If the trainee finds anything unsafe during the Vehicle inspection, get it fixed. Federal and state laws forbid operating an unsafe vehicle. • Check vehicle operation regularly: o Instruments. o Air pressure gauge (if the vehicle has air brakes). Temperature gauges. o Pressure gauges. Ammeter/voltmeter. o Mirrors. o Tires. o Cargo, cargo covers. Lights, etc. o If the trainee sees, hears, smells, or feels anything that might mean trouble, he/she should check it out. • Safety inspection. o Drivers of trucks and truck tractors when transporting cargo must inspect the securement of the cargo within the first 50 miles of a trip and every 150 miles or every 3 hours (whichever comes first) after. • Document any discrepancy on AF Form 1800. Sign-off AF Form 1800 to signify accomplishment of inspection.

Figure A4.2. Additional Steps for Inspecting Air Brakes System.

Additional Steps for Inspecting Air Brakes	
Step	**Procedure**
2. Engine Compartment Checks	• Check air compressor drive belt condition and tightness (if compressor is belt driven).
5. Walk-Around Inspecting	• Check manual slack adjusters on S-cam brakes. **Note:** Vehicles with automatic slack adjustors still must be checked. o Park on level ground and chock the wheels. o Release the parking brakes so the operator can move the slack adjusters. o Use gloves and pull hard on each slack adjuster that it can be reached.

	o Check slack adjuster, more than 1-inch indicates adjustments required (vehicles with too much brake slack can be very hard to stop). Adjust it or have it adjusted. • Check brake drums (or discs), linings, and hoses.
7. Final Air Brake Check	• Test low pressure warning signal. o Shut the engine off when the vehicle has enough air pressure so that the low pressure warning signal is not on. o Turn the electrical power on. o Step on and off the brake pedal to reduce air tank pressure. o Low air pressure warning signal should come on before the pressure drops to less than 60 psi in the air tank with lowest pressure. • Check that the spring brakes come on automatically. o Chock the wheels. o Release the parking brakes when enough air pressure is built up. o Shut the engine off. o Step on and off the brake pedal to reduce the air tank pressure. o "Parking brake" knob should pop out when the air pressure falls to the manufacturer's specification. • Check rate of air pressure buildup o Refer to manufacturer's recommendation for average buildup time. o If not within recommended time, the air pressure may drop too low during driving operations. • Test air leakage rate. o With a fully-charged air system (typically 125 psi). o Turn-off the engine. o Release the service brake and time the air pressure drop. o The loss rate should be less than 2 psi in one minute for single vehicles. o Not less than 3 psi in 1 minute for combination vehicles. • Then apply 90 psi or more with the brake pedal.

	o After the initial pressure drop, if the air pressure falls more than 3 psi in 1 minute for single vehicles. o Not more than 4 psi for combination vehicles. • Check air compressor governor cut-in and cut-out pressures. o Air compressor should start at about 100 psi and stop at about 125 psi. o Run the engine at a fast idle. o Air governor should cut-out the air compressor at about the manufacturer's specified pressure. o Engine idling, step on and off brake to reduce air tank pressure. o Compressor should cut-in at manufacturer's specified cut-in pressure. o Test parking brake: Stop the vehicle; put the parking brake on; gently pull against it in low gear to determine if parking brake will hold. ▪ Test service brakes. ▪ Wait for normal air pressure. • Release the parking brake. • Move the vehicle forward slowly (about 5 mph). • Apply the brakes firmly using the brake pedal. • Note any vehicle "pulling" to one side, unusual feel, or delayed stopping action.