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CARGO SECUREMENT



QUALIFICATION TRAINING PACKAGE

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Chapter 1

OVERVIEW

1.1. Overview. This Qualification Training Package (QTP) establishes standardized training requirements and content for all Department of the Air Force (DAF) personnel responsible for the securement and transportation of cargo. Designed to ensure consistency and excellence across all installations, this package provides comprehensive guidance for both trainers and trainees to ensure cargo is safely and legally secured prior to transport.

1.1.1. The training standards outlined herein align with DAF requirements and supplement federal regulations, specifically the Federal Motor Carrier Safety Administration (FMCSA) Cargo Securement Rules. This package serves as the authoritative source for curriculum development and performance evaluation. Trainers will utilize Chapters 2 through 5 to guide trainee preparation, conduct classroom lectures, provide demonstrations, and administer knowledge and performance evaluations.

1.1.2. Trainees are required to read this entire training package prior to starting lectures and must follow along with these materials during instruction. Successful completion of this training program demonstrates operator proficiency and supports mission readiness by maintaining the highest standards of safety, compliance, and operational effectiveness.

1.2. Applicability. This QTP applies to all DAF personnel tasked with loading, securing, and transporting cargo on any commercial or military vehicle. Because this specific module does not result in a Commercial Motor Vehicle Equivalent certification, the evaluation process is handled locally via standard training protocols.

1.2.1. Trainees will complete the written knowledge test, **Attachment 2**, and a hands-on Performance Test, **Attachment 3**.

1.2.2. Upon successful completion, the trainer/evaluator will document the results and sign off the respective tasks in the member's Individual Training Record (ITR), AF Form 623, *Individual Training Record Folder*, or electronic On-the-Job Training (OJT) record.

1.3. Administrative. Send comments and suggested improvements on DAF Form 847, *Recommendation for Change of Publication* through Air Force Installation and Mission Support Center (AFIMSC) functional managers via e-mail at: AFIMSC.A34OG.GroundTrans@us.af.mil.

Chapter 2

RESPONSIBILITIES

2.1. Trainer. Provide an overview of the training outlined in Chapters 2 and 3. Deliver classroom lectures and conduct trainee preparation using the lesson plans. Provide knowledge overview training, conduct demonstrations, and evaluate performance activities. Coordinate with the Unit Training Manager (UTM) or designated authority to ensure training is properly documented.

2.1.1. Review this QTP, applicable manufacturer operator's manuals for securement devices (e.g., binders, winches), and local directives with the trainee. Explain the QTP process and the trainee's responsibilities.

2.1.2. Conduct knowledge training with the trainees using this QTP.

2.1.3. Grade the review/knowledge questions using the provided answer key. Review any missed questions with the trainee to ensure the required task knowledge has been fully comprehended prior to hands-on application.

2.1.4. Conduct performance task explanations and demonstration using this QTP and available cargo securement devices.

2.1.5. Evaluate the trainee's task performance. The trainee must complete the performance test without assistance.

2.1.6. Document and sign-off the completed task(s) in the trainee's Individual Training Record (ITR), AF Form 623, or electronic OJT records.

2.2. Trainee. Read this QTP in its entirety prior to the lecture. Complete the required knowledge test and performance test identified in Chapter 1.

2.2.1. Ensure the trainer explains the QTP process and your responsibilities. Ask questions if you do not understand the objectives, safety requirements, or securement principles for each section.

2.2.2. Complete the recommended training hours for cargo securement.

2.2.3. Pass the required, closed-book Knowledge Checks with 80% or higher, and successfully complete the Performance Test with zero instructor assists.

2.3. Vehicle Control Official (VCO)/Unit Training Manager (UTM). Track the execution and completion of requirements. Ensure all testing results and task sign-off are properly loaded into the members' ITR, DAF Form 623, or electronic OJT records.

Chapter 3

INTRODUCTION

3.1. Objectives. Upon completion of lectures, demonstrations, and hands-on cargo loading sessions, trainees will successfully meet all training requirements. This training ensures the trainee becomes a qualified operator who possesses the knowledge and skills to properly secure and prepare various types of cargo loads for transport in a safe and professional manner. Trainees must achieve 80% or higher on the Knowledge Check and complete all components of the performance test with zero instructor assists.

3.2. Desired Learning Outcome.

3.2.1. Understand and apply the mandatory safety precautions to be followed pre-, during-, and post-loading and securement of cargo (including proper PPE usage).

3.2.2. Understand the physical principles of proper cargo securement (e.g., working load limits, aggregate strength, weight distribution) and its role in safe mission execution.

3.2.3. Safely and proficiently operate various securement devices to secure diverse cargo and equipment types (e.g., rolling stock, palletized loads).

3.3. Lesson Duration. Recommended instructional and hands-on training time is 8 hours. **Note:** This is a recommended baseline; training time may vary depending on how quickly a trainee demonstrates proficiency in the required tasks.

Table 3.1. Recommended Training Time for Training Activities.

Training Activity	Training Time
Trainee's Preparation	30 Min.
Instructor's Lecture and Demonstration	5 Hours
Trainee's Personal Experience (to build confidence and proficiency): • Perform Operator Securement • Utilize various securement devices	2 Hours
Trainee's Performance Evaluation	30 Min.

3.4. Instructional References.

3.4.1. QTP24-3- CGOSEC, *Cargo Securement*.

3.4.2. Risk Management (RM) and Safety Principles in accordance with (IAW) DAFI 90-802, *Risk Management* and DAFMAN 90-803 *Risk Management (RM) Guidelines and Tools*.

3.4.3. QTP 24-3, *General Vehicle Safety*.

3.4.4. Title 49, Code of Federal Regulations (CFR), Parts 392, *Driving of Commercial Motor*

Vehicles, and Part 393, Parts and Accessories Necessary for Safe Operation.

3.5. Instructional Training Aids and Equipment.

3.5.1. Cargo Securement QTP.

3.5.2. Applicable cargo-transporting commercial/military vehicle.

3.5.3. Various cargo equipment to include, but not limited to: ISUs, 463L loaded pallets, and rolling stock.

3.5.4. Various securement devices (e.g., ratchet binders, lever binders, chains, synthetic webbing/straps, edge protectors, and winch bars).

3.5.5. Manufacturer's operator's manuals for the specific vehicle and securement devices being utilized.

3.5.6. Suitable and secure training area.

Chapter 4

KNOWLEDGE OVERVIEW AND OPERATIONAL REQUIREMENTS

4.1. Cargo Transport Safety and Equipment Protocols. Prior to executing any cargo transit operations, both the trainer and the trainee must understand that the driver is solely responsible for the load securement of their vehicle and its cargo. This absolute responsibility remains with the driver regardless of whether they personally loaded and secured the cargo initially, or if the vehicle was prepared by other personnel. The operator is legally and operationally liable for verifying that the vehicle is safe to operate and that the load is properly prepared, balanced, and secured prior to transport.

4.1.1. Loading and Unloading Operations. Operators must only handle cargo loads that are completely stable and safely bundled (e.g., properly banded, shrink-wrapped, or palletized). Prior to loading, the operator must verify that the cargo weight and dimensions fall within the rated capacity of both the transport vehicle and the specific securement devices being utilized. Highly concentrated, unusually long, or excessively high loads alter the vehicle's center of gravity and overall capacity; therefore, the operator must adjust their driving habits and securement methods accordingly to prevent shifting or rollovers.

4.1.2. Mandatory Spotter Procedures. In accordance with DAF safety directives, the utilization of a spotter is mandatory during all loading, unloading, and backing maneuvers. The operator must maintain continuous visual contact with the spotter throughout the entire operation. Operator assumes all responsibility for safe vehicle operation.

4.1.2.1. Critical Safety Mandate. If at any point the operator loses visual contact with the spotter, the operator must stop the vehicle immediately. The vehicle must not move again until visual contact is re-established, and the spotter signals it is safe to proceed. For detailed spotter hand signals and procedures, reference QTP 24-3.

4.2. Country, DOT, State, and Air Force Cargo Requirements. For any regulations outside of the Continental U.S., members will need to identify the specifics of the cargo, weight, length, height, and or hazardous cargo being transported and reference host nation(s) specific transportation sites to review permits, height, and weight restrictions.

4.2.1. Code of Federal Regulations: <https://www.ecfr.gov/current/title-49/subtitle-B/chapter-III/subchapter-B/part-393?toc=1>. See resources Chapter.

4.2.2. U.S Government Freight Transportation Handbook: www.gsa.gov. See Contiguous United States / Outside the Contiguous United States regulations.

4.2.3. USTRANSCOM website: <https://www.ustranscom.mil/dtr/dtrp2.cfm>. See reference DTR 4500.9, *Transportation and Traffic Management*, Part II, *Cargo Movement*.

4.2.4. DoDM 4500.36, *Acquisition, Management, and Use of DoD Non-Tactical Vehicles*.

4.3. Vehicle Weight Ratings and Load Limits.

4.3.1. To safely distribute cargo, an operator must understand the differences between vehicle weight ratings and how they govern legal and physical limits.

4.3.1.1. Gross Vehicle Weight Rating (GVWR). The maximum operating weight of a single vehicle as specified by the manufacturer, including the vehicle's chassis, body, fuel, accessories, and cargo

4.3.1.2. Gross Combination Weight Rating (GCWR). is the value specified by the manufacturer of the power unit displayed by the Federal Motor Vehicle Safety Standard (FMVSS) certification label; or the sum of the GVWRs or the gross vehicle weights (GVWs) of the power unit along with the towed unit, or any combination thereof, that produces the highest value.

4.3.2. Practical Weight Calculation Example. While GVWR and GCWR work together, they are independent limits. You must never exceed the lower of the structural safety limits of any single component.

4.3.2.1. Tractor GVWR: 52,000 lbs. (Curb Weight: 13,300 lbs.)

4.3.2.2. GCWR (Combined Limit): 80,000 lbs.

4.3.2.3. Trailer Curb Weight: 14,100 lbs.

4.3.2.4. Trailer Max Cargo Capacity: 40,000 lbs.

4.3.2.5. Total Rig Curb Weight: 13,300 lbs.+14,100 lbs.=27,400 lbs.

4.3.2.6. Theoretical Max Cargo Weight: 80,000 lbs.-27,400 lbs.=52,600 lbs.

4.3.2.7. The Bottleneck Rule: Even though the math allows for 52,600 lbs. of cargo before hitting the combined weight limit (GCWR), the trailer's physical structure is rated for a maximum of 40,000 lbs. Therefore, you can only load a maximum of 40,000 lbs.

4.4. Load Distribution and Axle Weight Limits. Knowing your cargo's physical dimensions (height, weight, and width) is the first step in proper weight distribution. Proper placement ensures you do not exceed federal regulations, axle capacity limits, or create an unstable center of gravity.

4.4.1. Five-Axle Tractor-Trailer Weight Distribution. While individual state and international regulations vary, the standard legal weight distribution for a typical 5-axle tractor-trailer combination pulling a maximum of 80,000 lbs. is broken down. See **Figure 4.1.** **Note:** If cargo is placed too far forward, you risk overloading the drive axles. If placed too far back, you risk overloading the trailer axles. Always distribute weight evenly across the deck.

Figure 4.1. Axle Load Distribution.



4.4.2. Immobilizing Cargo. All types of cargo **must** meet one of three conditions:

4.4.2.1. Condition 1: Full containment. Under the first condition, cargo is fully contained by vehicle structures of adequate strength. When using this method, the physical design of the vehicle must guarantee that the cargo cannot shift or tip. Specifically, the vehicle structure or surrounding cargo must completely restrain any horizontal movement, preventing the load from sliding forward, rearward, or side-to-side.

4.4.2.2. Condition 2: Immobilization by Structure. If full containment is not possible, cargo must be immobilized by structures of adequate strength. This is achieved by relying on a strategic combination of the vehicle's physical structure, blocking, and bracing. Together, these elements must form a rigid system that prevents any shifting or tipping during transit.

4.4.2.3. Condition 3: Secured On or Within the Vehicle. Under the third condition, cargo is immobilized or secured on or within a vehicle using active securement devices. To prevent shifting or tipping, operators must use a combination of tiedowns alongside blocking, bracing, friction mats, other cargo, or void fillers.

4.4.2.4. When articles of cargo are placed beside each other and secured by side-to-side tiedowns, you must either place them in direct contact with each other or prevent them from shifting toward each other in transit by blocking or by filling the space with other cargo.

4.4.2.5. For articles of cargo that tend to roll, you must provide more than one point of contact to prevent movement. This requires lifting the cargo off the deck, utilizing chocks, wedges, a cradle, or other equivalent means—or a combination of both. Any device used to prevent rolling must be secured to the deck and must not become unfastened or loose while the vehicle is in transit.

4.4.3. Oversize Cargo.

4.4.3.1. Regardless of where you are stationed, or what countries or states you are driving through, you must know the height, width, and weight restrictions imposed by those countries or states and if exceeding restrictions, where to acquire a permit(s) for oversized transport.

4.4.3.2. Over-length, over-width, and/or over-weight loads require special transit permits additionally, transporting oversized cargo may be limited to specific routes, times, or durations.

4.4.3.3. Special equipment may be necessary such as “wide load” or “oversize load” signs, flashing lights, flags, etc. Additionally, certain oversize loads may require pilot and/or chase vehicles bearing warning signs or flashing lights or police escort. Once again, you must defer to the countries or states you will be driving in or through for specific requirements.

4.4.4. Weigh Scales vs. Weigh Stations.

4.4.4.1. Most stateside truck stops have weigh-stations (e.g., CAT Scale Company) that provide operators with the ability to accurately identify how much weight is on each axle along with the total weight of the cargo and the vehicle transporting the cargo.

4.4.4.2. Weigh stations hold carriers responsible for not only load capacity but also ensuring carriers are meeting load securement requirements. Additionally, weigh station operators have jurisdiction should they choose to pull a vehicle over to complete level 1, 2, or 3 inspections.

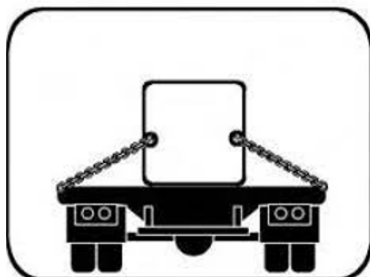
4.4.4.2.1. While those operating and transporting DoW equipment may not be required to stop at weigh stations, if operators are not following state(s) or country(s) weight limits by axle or are exceeding capacity, they may be placed “out of service” by their local law enforcement and not allowed to “return to service” until discrepancy has been corrected.

4.5. Direct vs. Indirect Tiedowns.

4.5.1. Direct vs in-direct tiedowns to include meeting 50% of GVW (curb weight) and how it’s calculated along with effect of angle on indirect tiedowns. This will also help with understanding when to switch from straps to chains and vice versa.

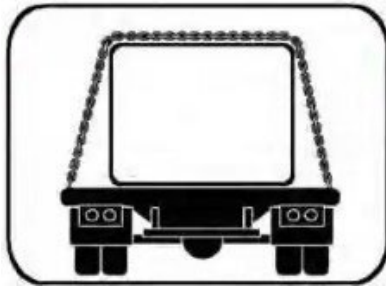
4.5.1.1. Direct securement. The tiedown goes from the trailer securement point directly to the cargo and will be used primarily for rollingstock IAW 49 CFR 393.106(d)(1) as applicable. Direct securement reduces the working load limit by half as it doesn’t spread the force of the tiedown to the entire tiedown.

Figure 4.2. Direct Tiedown.



4.5.1.2. Indirect securement. The tiedown goes from, through, or over the cargo and then back to the trailer primarily used for 463Ls, etc. IAW 49 CFR Part 393.106(d)(2)(3). In other words, it's using both sides of the trailer for securement where you find the anchor point. Chains or straps will either go over or around the cargo to the trailer anchor point, this allows the entire working load limit to work on the tiedown point tied to, over, or through.

Figure 4.3. Indirect Tiedown.



4.5.2. Depending on the method used, the sum of all working load limits (WLL) must be equal to or greater than 50% of the overall weight of the load.

4.5.3. The decision of choosing between straps and chains depends on the cargo, environmental conditions, and transport method. Lightweight and delicate freight, straps along with edge protectors provide the necessary protection and efficiency. However, straps may also be used on some rolling stock depending upon equipment weight and the WLL of the straps.

4.5.4. When making your decision, you should factor in road conditions and the type(s) of cargo being transported. Typical cargo consisting of boxes, palletized equipment, or tri-walls, straps would be the preferred method. This is based on the flexibility of the straps to be able to wrap around or go over the cargo without damaging it. On the other hand, if transporting larger, more robust items such as cargo over 10,000 lbs. chains should be considered if applicable.

4.5.5. Chains can be difficult to use when using the indirect method of tiedown due to their lack of flexibility when contouring to a load unless you are securing jersey barriers for example. Otherwise, most indirect loads are secured with straps. When using the direct tiedown method, it is significantly easier to utilize chains with the appropriate anchor point on both the cargo and the trailer. **NOTE:** Indirect securement will not be used on any form of rollingstock per 49 CFR Part 393.130 (c).

4.6. Cargo Length and Weight Tiedown Requirements.

4.6.1. Background Information.

4.6.1.1. The rules are based on the FMCSA North American Cargo Securement Standard Model Regulations outlined in the Driver's Handbook on Cargo Securement however, overseas countries may have their own requirements and will be followed accordingly.

4.6.1.2. Rules apply to all U.S., Canadian, and Mexican commercial motor vehicles operating in interstate commerce (applies to all types of articles of cargo except commodities in bulk that lack structure or fixed shape (e.g., liquids, gases, grain, liquid concrete, sand, gravel, aggregates)).

4.6.2. Minimum number of tiedowns.

4.6.2.1. When tiedowns are used as part of a cargo securement system, the minimum number of tiedowns required to secure an article or group of articles against movement depends on the length of the article(s) being secured, and the requirements of paragraphs (b) and (c) of this Chapter. These requirements are in addition to the rules under 49 CFR 393.106.

4.6.2.2. When an article is not blocked or positioned to prevent movement in the forward direction by a header board, bulkhead, other cargo that is positioned to prevent movement, or other appropriate blocking devices, it must be secured by at least:

4.6.2.3. One-tiedown for articles 5 feet (1.52 meters) or less in length, and 1,100 pounds (500 kg) or less in weight.

4.6.2.4. Two tiedowns if the article is:

4.6.2.4.1. Five feet (1.52 meters) or less in length and more than 1,100 pounds (500 kg) in weight; or

4.6.2.4.2. Longer than five feet (1.52 meters) but less than or equal to 10 feet (3.04 meters) in length, irrespective of the weight.

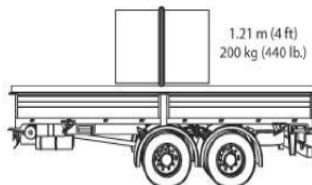
4.6.2.4.3. If the article is longer than 10 feet (3.04 meters), two tiedowns are required and one additional tiedown for every 10 feet (3.04 meters) of article length, or fraction thereof, beyond the first 10 feet (3.04 meters) of length.

4.6.2.5. If an individual article is blocked, braced, or immobilized to prevent movement in the forward direction by a header board, bulkhead, other articles which are adequately secured or by an appropriate blocking or immobilization method, it must be secured by at least one tiedown for every 3.04 meters (10 feet) of article length, or fraction thereof.

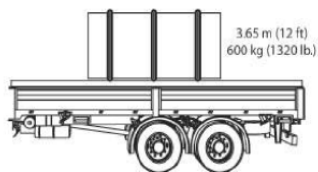
4.6.2.6. If cargo is not prevented from forward movement (for example, by the headboard, bulkhead, other cargo, or tiedown attached to the cargo), secure the cargo according to the following requirements:

Figure 4.4. Tiedown v. Size & Weight.

Article Description	Minimum # of Tiedowns
♦ 1.52 m (5 ft) or shorter	1
♦ 500 kg (1,100 lb.) or lighter	

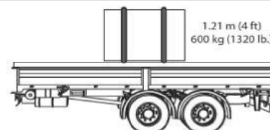


Article Description	Minimum # of Tiedowns
Longer than 3.02 m (10 ft)	2 + 1 tiedown for every additional 3.02 m (10 ft), or part thereof



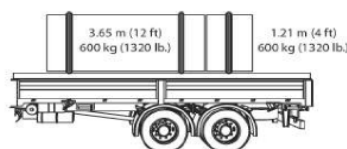
When cargo is prevented from forward movement (for example, by the headboard, bulkhead, other cargo, or tiedown), secure the cargo according to the following requirements:

Article Description	Minimum # of Tiedowns
♦ 1.52 m (5 ft) or shorter	2
♦ Over 500 kg (1,100 lb.)	



Article Description	Minimum # of Tiedowns
More than 1.52 m (5 ft) but 3.02 m (10 ft) or less	2

Article Description	Minimum # of Tiedowns
All Cargo	1 tiedown for every 3.04 m (10 ft), or part thereof



Exceptions to the Minimum Tiedown Requirements (Section 2.2.3.2)



A vehicle transporting one or more articles of cargo such as, but not limited to, machinery or fabricated structural items (e.g., steel or concrete beams, crane booms, girders, and trusses, etc.) which, because of their design, size, shape, or weight, must be fastened by special methods.

However, any article of cargo carried on that vehicle must be securely and adequately fastened to the vehicle.

4.6.2.7. Tiedowns should be positioned to preserve the integrity of the cargo; additional blocking may be required to support additional straps depending on the length of the cargo.

Figure 4.5. Tiedown Positioning.



4.6.3. Special Rules for Special Purpose Vehicles. Cargo with certain designs, size, shape, or weight must be fastened by special methods and do not fall under the basic rules concerning the minimum number of tiedowns when transporting one or more articles of cargo, such as machinery or fabricated structural items (e.g., steel or concrete beams, crane booms, girders, and trusses, etc.).

4.6.4. Commodity-Specific Securement Requirements. The Federal Motor Carrier Safety Administration has adopted detailed requirements for the securement of the following commodities: logs, dressed lumber, metal coils, paper rolls, concrete pipes, intermodal

containers, automobiles, light trucks and vans, heavy vehicles, equipment and machinery, flattened or crushed vehicles, roll-on/roll-off containers, and larger boulders. The North American Cargo Securement Standard Driver's Handbook on Cargo Securement and 49 CFR 393.116 - 393.136 for rules regarding each specific commodity.

4.6.5. Internal Airlift/Helicopter Slingable Container Units (ISUs)/463L Pallets. ISUs/pallets must only be transported on flatbed trucks and trailers when they are supported by 3 rows of dunnage (wood, recycled rubber or plastic) with a uniform thickness of at least 3 inches and 88 inches long. The dunnage does not need to be independently secured to the trailers when placed under the ISUs/pallets.

4.6.5.1. The utilization of crossed chains from the upper corners of the ISUs must happen unless there is a safety concern (rain, slippery conditions, etc.). If there is a safety concern with using the upper corners of the ISUs as tie-down points, straps of the appropriate WLL can be utilized but must be run over the top and never through the forklift tine holes, and the use of rated tie-down points must be used.

4.6.6. Tiedown Angle.

4.6.6.1. Tiedown angles will match from side to side and front to back as much as possible.

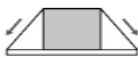
4.6.6.2. Direct tiedown works best at low angles; angles of 25 degrees or less will maintain 90% of the tiedown strength where a direct tiedown at a 60-degree angle will have less than 50 percent of its strength.

Figure 4.6. Direct Tiedown Angle Strength.

Example	Approximate angle	Direct lashing angle effect	Direct lashing effectiveness
	25°	0.90	90%
	30°	0.86	86%
	45°	0.70	70%
	60°	0.50	50%

4.6.6.3. Indirect tiedowns work by increasing the effective weight of the cargo. The steeper the tiedown angle the less shifting (ideally more than 45 degrees).

Figure 4.7. Indirect Tiedown Angle Strength.

Example	Approximate angle	Tie-down angle effect	Tie-down effectiveness
	90°	1.00	100%
	60°	0.85	85%
	45°	0.70	70%
	30°	0.50	50%
	15°	0.25	25%

4.6.7. Aggregate Working Load Limit.

4.6.7.1. The aggregate working load limit of any securement system used to secure an article or group of articles against movement must be at least one-half the weight of the article or group of articles.

4.6.7.2. The aggregate working load limit is the sum of: One-half the working load limit of each tiedown that goes from an anchor point on the vehicle to an attachment point on an article of cargo; and the working load limit for each tiedown that goes from an anchor point on the vehicle, thru, over or around the cargo and then attaches to another anchor point on the vehicle.

4.7. Components of a Securement System.

4.7.1. Securement Anchor Point.

4.7.1.1. Anchor points are defined as a structure, fitting or attachment, either on a vehicle or on the freight itself to which a tiedown can be attached. Examples include D-rings, chain tiedowns, winches, winch track, welded rods, stake pockets, and pipe spools.

4.7.1.2. Anchor points must be strong enough to meet the performance criteria of 49 CFR 393.102 with no damage or weakened components, such as, but not limited to, cracks or cuts that will adversely affect their performance for cargo securement purposes, including reducing the working load limit.

4.7.1.3. Special purpose vehicles (e.g., tow-tractors, A/T forklifts, etc.) typically have Transportation data plates which identify tiedown requirements and locations specifically for air transport but can also be used for over the road transport securement points.

4.7.1.4. Unauthorized anchor points include rub-rails unless rated by the manufacturer and chains running down the side of the trailer.

4.7.2. Securing Device.

4.7.2.1. Securing devices are defined as any device specifically manufactured as a means to attach or secure cargo to a vehicle or trailer.

4.7.2.2. Securing devices include synthetic webbing, chain, wire rope, manila rope, synthetic rope, steel strapping, clamps and latches, grab hooks, binders, shackles, winches, and webbing ratchet.

4.7.2.2.1. CAUTION: Lever style chain binders will only be opened or closed with a square-headed winch bar using both hands and by positioning yourself to avoid the binder's stored energy when the binder is released.

4.7.2.2.2. Do not use locally engineered leverage amplifiers, extension handles, pipe extensions (e.g., cheater pipes), or other unapproved mechanical advantages.

4.7.2.3. A tiedown must be designed, constructed, and maintained so the driver can tighten it and must be attached and secured so it does not become loose or unfastened, open, or release during transit.

4.7.2.4. All tiedowns and other components of a cargo securement system must be located within the rub rails, when present. This requirement does not apply when the width of the load extends to or beyond the rub rails and appropriate measures must be taken to prevent cutting, tearing, or rubbing of the securement devices.

4.7.2.5. Container locks are another securing device primarily used with intermodal containers (shipping containers). All lower corners of the container must rest or be secured to the container chassis with securement devices that cannot unintentionally become unfastened while the vehicle is in transit (see 49 CFR 393.126(b)).

4.7.3. Tiedown.

4.7.3.1. A tiedown is defined as the combination of securing devices that forms an assembly that: attaches cargo to or restrains cargo on a vehicle and is attached to an anchor point.

4.7.3.2. Tiedowns are attached to the cargo and provide direct resistance to restrain the cargo from movement.

4.7.3.3. Shoring (load) bars simply clamp against the inside surfaces of a van truck or trailer's cargo structure or fit into tracks or rails specially designed for this purpose. E-track straps can also be used with track or rails systems. The strength of the bars and cargo weight dictate when and where they can be used.

4.8. Securement Devices Serviceability.

4.8.1. Chains.

4.8.1.1. Elongation or deformation: Check for stretching or bending in the chain links or hooks.

4.8.1.2. Nicks, gouges, or cracking: Examine hooks and load pins for surface damage.

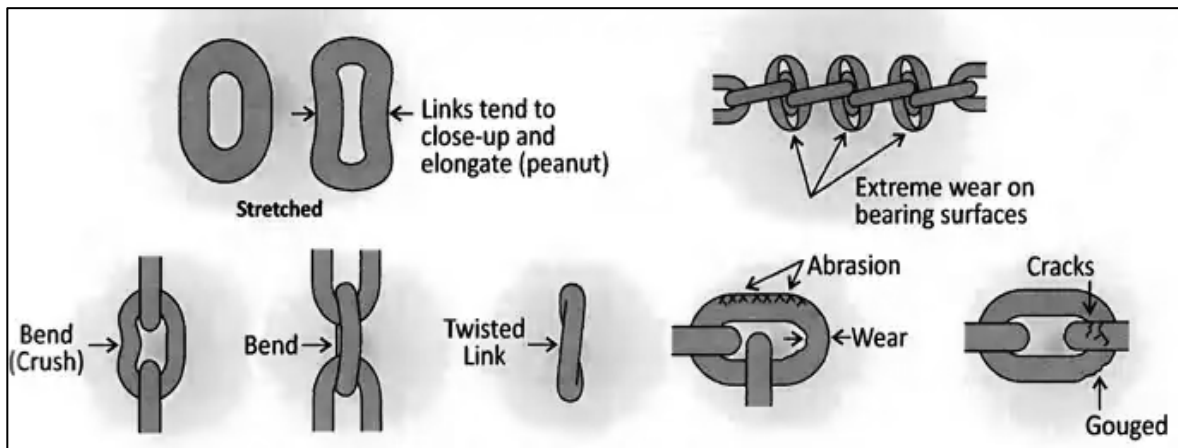
4.8.1.3. Rust or corrosion: While surface rust might be removable, deeply corroded components need replacement.

4.8.1.4. Material thickness: Ensure the material thickness at any point on a chain link is not below the minimum specified value for that chain grade.

4.8.1.5. Damaged connecting links: If the links connecting the chain to other hardware show damage, the entire chain should be stopped from using.

4.8.1.6. Missing or illegible markings: Ensure the chain's grade is clearly marked (e.g., G70 has a 7, 70, or 700 and a yellow finish).

Figure 4.8. Out-of-Service Criteria for Chain Links.



4.8.2. Straps (synthetic webbing):

4.8.2.1. Cuts, holes, or burns: Small cuts, holes, or burns may be acceptable within certain limits based on strap width.

4.8.2.2. Abrasive wear: Look for excessive wear, friction burns, or crushed areas.

4.8.2.3. UV degradation: Signs of sun exposure like discoloration or fading indicate weakening of the webbing.

4.8.2.4. Mold or mildew: Exposure to moisture can weaken the strap fibers; if present, the strap should be replaced.

4.8.2.5. Stitching integrity: Inspect load-bearing splices for broken, worn, or frayed stitches.

4.8.2.6. Missing or illegible identification tag: Straps must have a tag showing the working load limit and manufacturer. If it's missing or unreadable, inspectors may downgrade the strap to the minimum WLL based on its width. These straps must be replaced as soon as possible.

4.8.2.7. Damaged or incorrect hardware: Ensure hooks, D-rings, and buckles are not cracked, pitted, corroded, or distorted, and that their WLL is equal to or greater than the strap.

Figure 4.9. Unserviceable Straps.

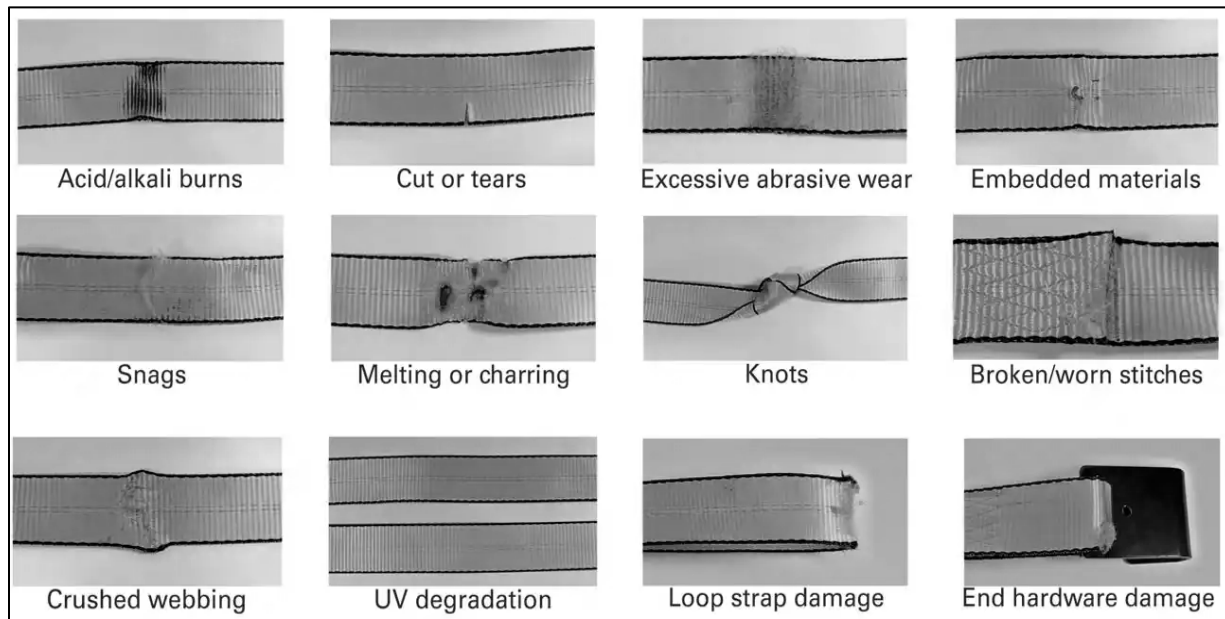


Figure 4.10. Unreadable Working Load Limit Tag.



4.8.3. Binders (Load Binders):

4.8.3.1. Visible damage or deformation: Look for bent, cracked, or warped components.

4.8.3.2. Hooks and chains: Inspect for wear, thinning, or damage similar to chains.

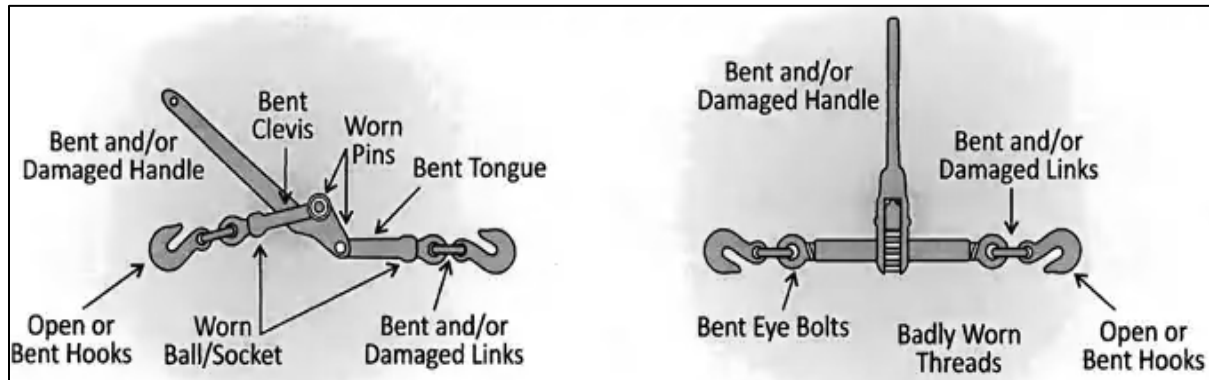
4.8.3.3. Ratchet mechanism: Ensure it operates smoothly without sticking or jamming.

4.8.3.4. Rust or corrosion: Deep corrosion warrants replacement.

4.8.3.5. Identification markings: Verify the binder's WLL and size markings are legible.

4.8.3.6. Distortion in lever binder yokes: Inspect for distortion in the yoke of lever-type binders.

Figure 4.11. Binder Types & Components.



4.8.4. Additional Notes:

4.8.4.1. The most common grade of chain and binder for cargo securement are Grade 70 and the stamp can be found on the links/hooks of the chains and binders. (See **Figure 4.12. Binder Working Load Limit**)

4.8.4.2. Serviceability should be conducted at least annually of all items, link by link, hook by hook, and strap by strap to identify any wear, tears, or cracks.

4.8.4.3. Additionally, all should follow manufacturers' guidelines, DOT, Federal Motor Carrier Safety Administration regulations for any additional needs on inspecting for serviceability.

4.8.5. General Recommendations:

4.8.5.1. Inspect all components before each use in accordance with 49 CFR 393.104.

4.8.5.2. Never exceed the working load limit of any component.

4.8.5.3. Store securing devices properly to minimize exposure to harsh environments.

4.8.5.4. Chains, binders, and straps should be replaced when they show signs of wear, damage, or age-related degradation, regardless of their age. Regular inspection is crucial to identify these issues and ensure safety.

4.9. Working Load Limits.

4.9.1. Maintaining secure and safe cargo transport is mission critical. Understanding the WLL

of securement devices ensures compliance with federal regulations and safeguards military assets during transport. This chapter outlines the best practices and regulatory standards related to the selection and use of securement equipment.

4.9.2. Working Load Limit: The WLL is the maximum load that may be applied to an individual component of a cargo securement system, and is typically assigned by the component manufacturer. To ensure safe transit, the combined WLL of all securement devices utilized must equal or exceed 50% of the total weight of the cargo being secured.

4.9.2.1. Example: For 18,000 lbs. of cargo, the combined WLL of tiedowns must be at least 9,000 lbs.

4.9.3. When calculating the WLL of the securement system (chain(s), binder(s), and tiedown point(s)) the device with the lowest WLL will be used to determine the overall WLL of the system.

4.9.4. Unmarked Tiedowns. When tiedowns are used without any working load limit marking on them or the tag is missing, consider their strength to be only as good as the weakest version of that type of rated tiedown. **NOTE:** The 5,000lb rated CGU-1/B aircraft (white) cargo straps while rated for aircraft use, the CFR does not recognize the WLL since there is no identification tag and are given the lowest rating based on the strap's width.

Table 4.1. Synthetic Webbing (Cargo Strap) Minimum WLL Ratings.

Strap Width	Typical WLL	Strap Width	Typical WLL
1 3/4 in.	1,750 lbs.	3 in.	3,000 lbs.
2 in.	2,000 lbs.	4 in.	4,000 lbs.

Table 4.2. Chain Working Load Limits. NOTE: Chains must be embossed with grade and size markings. Unmarked chains default to Grade 30, which has lower WLL.

Chain Size	Grade 30	Grade 43	Grade 70	Grade 80	Grade 100
1/4 in.	1,300 lbs.	2,600 lbs.	3,150 lbs.	3,500 lbs.	4,300 lbs.
5/16 in.	1,900 lbs.	3,900 lbs.	4,700 lbs.	4,500 lbs.	5,700 lbs.
3/8 in.	2,650 lbs.	5,400 lbs.	6,600 lbs.	7,100 lbs.	8,800 lbs.
7/16 in.	3,700 lbs.	7,200 lbs.	8,750 lbs.	-	-
1/2 in.	4,500 lbs.	9,200 lbs.	11,300 lbs.	12,000 lbs.	15,000 lbs.
5/8 in.	6,900 lbs.	13,000 lbs.	15,800 lbs.	18,000 lbs.	22,600 lbs.

4.9.5. Chain Binders. Binders (ratchet or lever types) must have WLLs stamped or raised on the handle or body of the binder; any binder **not** having a WLL identified **shall not** be used.

Figure 4.12. Binder Working Load Limit.



4.9.6. Hooks and anchor points must also meet WLL and be properly rated for the expected load.

4.9.7. Rub rails are not acceptable securement points unless rated by the manufacturer. Securement devices must pass through or attach to manufacturer identified/rated anchor points at, below, or behind rub rails. Do not secure directly to the rub rail.

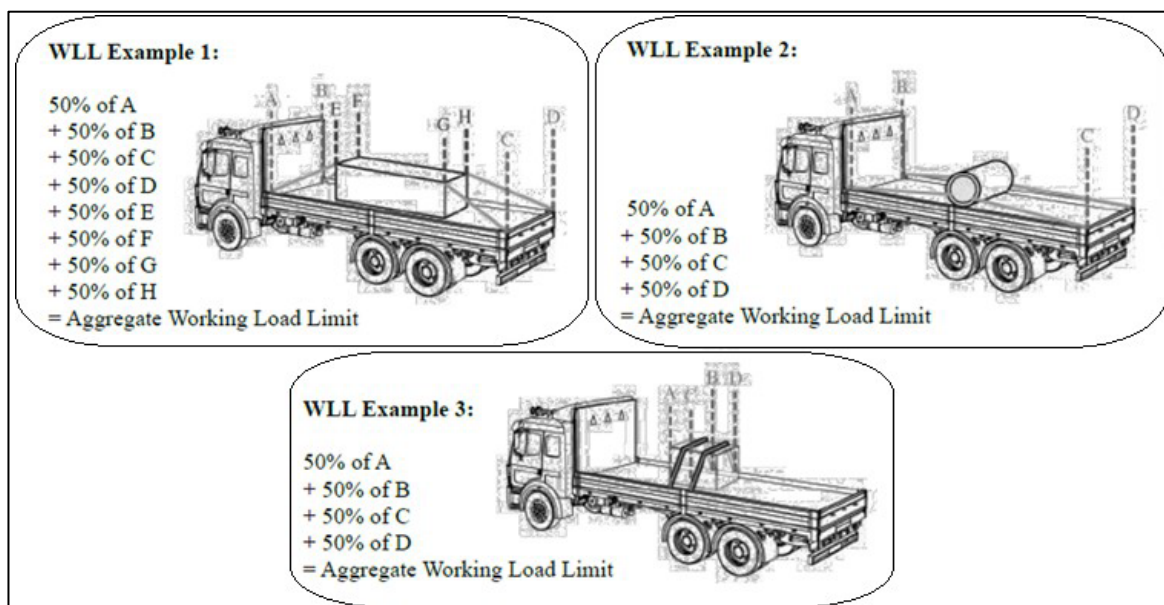
4.9.8. Aggregate WLL.

4.9.8.1. Calculating Aggregate WLL: To prevent cargo from shifting or falling, the combined (aggregate) WLL of all securement devices used must equal at least 50% of the total cargo weight. To calculate your aggregate WLL, use the following simple rules:

4.9.8.1.1. For Tiedowns Crossing Over the Cargo: Add the full WLL of each tiedown that goes from one anchor point, over the cargo, to another anchor point.

4.9.8.1.2. For Tiedowns Attached Directly to the Cargo: Add up 50% (half) of the WLL of each tiedown that runs from the vehicle anchor point directly to the cargo itself.

Figure 4.13. Aggregate Working Load Limit.



4.10. Edge Protection Requirements. Edge Protection Requirements: Edge protection must be used whenever a tiedown—whether chain, strap, or wire rope—is subject to abrasion, tearing, or cutting at the point of contact with an article of cargo. The edge protection material itself must be durable enough to actively resist crushing, cutting, and abrasion during transit.

Figure 4.14. Edge protector.



4.11. Blocking and Bracing.

4.11.1. To prevent cargo from shifting, tipping, or falling during transit, securement systems rely heavily on blocking, bracing, and dunnage. Each of these methods serves a specific structural purpose within the vehicle.

4.11.1.1. Blocking involves using rigid devices—such as lumber, metal beams, or shoring bars—placed snugly against the cargo to actively restrict any horizontal movement, whether forward, backward, or side-to-side.

4.11.1.2. Bracing complements this by utilizing devices like bars, straps, or angled supports positioned to prevent the cargo from tipping over, typically supporting the load from above or at specific angles.

4.11.1.3. Additionally, operators frequently rely on dunnage. This is a broad industrial packaging term referring to materials like plastic, foam, wood, or corrugated paper that are used to fill empty voids, protect the cargo's surface, and further stabilize the overall load.

4.11.2. Whenever wood is selected for blocking, bracing, or dunnage, it must meet strict structural standards to prevent failure under pressure. Hardwood is always the recommended choice for load-bearing applications. Any wood used must be properly seasoned and completely free from rot, decay, knots, knotholes, or splits. Furthermore, the grain of the wood must run lengthwise. This ensures the wood retains its maximum structural integrity and does not splinter or snap under the shifting weight of the cargo.

4.11.3. Applying these securement methods is not optional under certain operational conditions. Blocking and bracing are strictly required whenever cargo items are not fully enclosed by the vehicle's physical structure, or when they are not in direct, tight contact with other safely secured cargo. Essentially, if an item has any physical potential to slide, shift, roll, or fall, it must be actively blocked and braced.

4.11.4. These techniques are especially critical when transporting standard, heavy commodities that are prone to movement. Operators will frequently need to implement dedicated blocking and bracing configurations for industrial materials such as logs, dressed lumber, metal coils, paper rolls, and concrete pipe. The exact same requirements apply to larger specialized loads, including intermodal or roll-on/off containers, automobiles, flattened vehicles, heavy machinery, and large boulders. In all these scenarios, blocking and bracing form the foundation of a safe and compliant transport operation.

4.11.5. Cargo must be secured using systems IAW 49 CFR 393.100 - 393.136, that prevent movement:

4.11.5.1. Forward force (deceleration): 0.8 g (80%)

4.11.5.2. Rearward force (acceleration): 0.5 g (50%)

4.11.5.3. Sideways force: 0.5 g (50%)

4.11.6. Hazardous cargo IAW 49 CFR 174.55 must be:

4.11.6.1. Blocked and braced unless naturally immobilized or protected by adjacent freight. Container doors cannot be relied on to secure hazardous materials.

Table 4.3. Materials and Equipment for Blocking and Bracing.

Material	Use Case	Notes
Hardwood lumber	Blocking forward/backward movement	Must meet strength standards
Steel bars	Side bracing or structural reinforcement	Often used with anchor systems
Dunnage bags	Filling gaps between cargo	Not suitable for high-force loads
Shoring beams	Lateral bracing in enclosed trailers	Should be rated and inspected
Wedges/cradles	Stabilizing cylindrical cargo	Prevents rolling or shifting

4.11.7. To keep cargo safe and secure during transit, always follow these basic rules:

4.11.7.1. First, only use securement materials that are undamaged and strong enough to hold your specific load.

4.11.7.2. When securing your cargo, always install your blocking and bracing before you tighten any tiedowns. This creates a solid foundation from the start. Make sure to place your braces directly against the cargo's main contact points to stop it from tipping or pivoting.

4.11.7.3. Once everything is in place, double-check that your bracing is tightly anchored

so it cannot shake loose from normal road vibrations or sudden bumps. Finally, before you hit the road, physically test and visually inspect the entire setup to make sure nothing moves.

4.12. Tarping Cargo.

4.12.1. Tarping is a necessity when the cargo requires additional protection, such as loose materials, sensitive equipment, or materials exposed to the elements. Additionally, state(s) or country(s) may have their own specific tarping regulations/requirements and must be adhered to.

4.12.2. There are several different types of tarps depending on the cargo requiring protection however, general purpose, light-duty tarps will not be used for over-the-road transportation. Flatbed tarps have thicker material along with reinforcements and will have d-rings and grommets to serve as tiedown points.

4.12.3. Prior to tarping, secured cargo should be inspected for sharp edges; padding will be added to prevent the tarp from tearing. Securement devices should be under the tarp(s) whenever possible as this causes undo wear and tear on the tarp(s).

4.12.4. Tarps should be unfolded/opened from atop the cargo whenever possible. Tarps should be draped evenly over the entire load or when multiple tarps are required for loads longer than the tarp, the forward tarp must overlap the front of the rear tarp to prevent ballooning and moisture seepage.

4.12.4.1. CAUTION: You must be aware of your footing when draping tarps while standing on top of the cargo, while on the edge of the trailer, or when using a ladder. Additionally, tarps should be applied with the wind, when possible, to prevent injuries.

4.12.5. When securing tarps, the forwardmost end of the tarp should land evenly on the deck of the trailer and bungees should pull towards the rear of the trailer. The side edges of the tarp(s) should be rolled up to rest on the top of the trailer deck and secured with bungees. The rearmost flap/ed of the tarp should be secured down towards the deck and lower grommets/d-rings bungeed towards the front of the trailer. The remaining material from each side of the tarp should be folded down from the top to for a triangle. Each triangle is then pulled to the opposite side of the trailer and bungeed down to prevent ballooning.

4.13. Load Securement Inspection Intervals.

4.13.1. Operators will inspect and secure their loads before starting their vehicles. Additionally, operators will inspect cargo securement within the first 50 miles of the trip to ensure that nothing has shifted, broken, or loosened. Additionally, every 3 hours or 150 miles driven to comply with FMCSA requirements.

4.13.2. If placarded, tires **must** be checked at the beginning and end of each trip IAW QTP24-3-HAZMAT, *Explosive/Hazardous Materials Transport*, and should also be inspected during the 50-mile and 3-hour/150-minute inspection intervals.

4.13.3. Every time the driver has a break in driving, i.e., rest stops, overnight visits, etc. their cargo securement will be inspected.

4.13.4. Drivers will ensure each piece of cargo needs to be correctly strapped or chained and binded properly according to the transportation data plate and designated tiedown points and if needed, retightened.

4.13.5. Sealed dry van cargo trucks or trailers are the exception to this rule as the seals will not be broken except by the receiver of the cargo.

Chapter 5

EXPLANATION AND DEMONSTRATION

5.1. Instructor's Preparation. Prior to instruction, the instructor must establish a safe training location and schedule or reserve the appropriate vehicle(s). The instructor is also responsible for obtaining the appropriate vehicle operator's manual and preparing the specific cargo that will be used to demonstrate proper loading and securement techniques.

5.2. Safety Procedures and Equipment. Both the instructor and trainee must strictly adhere to all safety protocols, beginning with the mandatory removal of all jewelry and identification tags prior to operation. The instructor will conduct an initial walk-around of the vehicle to familiarize themselves and the trainee with all warning labels, signs, and vehicle-specific hazards.

5.2.1. Personal Protective Equipment (PPE) and Risk Management. The instructor and trainee must wear appropriate PPE at all times, which includes safety steel-toed boots and the use of gloves during all cargo loading and unloading operations. Additional required gear—such as raingear, cold weather gear, hearing protection, and a reflective belt (mandatory during hours of reduced visibility or on the flightline)—will be worn based on environmental conditions. Throughout the demonstration, the instructor will actively practice and model the five-step Risk Management (RM) process: identifying hazards, assessing hazards, developing controls and making decisions, implementing those controls, and finally, supervising and evaluating the securement operation. Refer to DAFI 90-802, *Risk Management* for additional information.

5.3. Operator Maintenance Demonstration. Prior to any practical loading or securement, the instructor will accomplish a comprehensive vehicle inspection alongside the trainee. The instructor will ensure the operator properly evaluates the vehicle and ensure all findings are accurately documented using the DAF Form 1800, *Operator's Inspection Guide and Trouble Report*.

5.4. Operation Demonstration. Throughout the entirety of the practical demonstration, the instructor must maintain an interactive learning environment by continuously allowing time for the trainee to ask questions. To ensure complete comprehension of complex cargo securement techniques, the instructor will repeat demonstrations as needed until the trainee fully understands the standards and procedures.

Chapter 6

PERFORMANCE DEMONSTRATION AND EVALUATION

6.1. Performance and Practical Application. Following the instructor demonstration, the trainee will transition to hands-on cargo loading and securement practice. The trainer must ensure a safe loading environment at all times and immediately stop training if any safety infractions occur. The trainee must remove all jewelry and identification tags, and don appropriate PPE (safety steel-toed boots, heavy-duty gloves for cargo handling, and reflective belts if required) before handling any cargo or securement devices.

6.2. Equipment and Vehicle Inspection Execution. The trainee will conduct a pre-use inspection of the vehicle's cargo deck, anchor points, and all securement devices (chains, synthetic straps, wire rope, binders, and dunnage). The trainee must verbally explain the items being inspected to the trainer, specifically pointing out how to identify defects such as cuts, fraying, or bent hooks that would render the equipment unserviceable. The trainee must also explain how to determine the WLL of the equipment being used, ensuring all discrepancies are properly documented on DAF Form 1800.

6.3. Trainee Operational Execution. The trainer will provide various types of cargo to be loaded onto the vehicle. The trainee will practice applying the three primary conditions of securement (full containment, immobilization by structure, and secured via tiedowns) until they show proficiency. The trainee must successfully explain and calculate the 50% WLL minimum requirement for the load they are securing.

6.3.1. Blocking and Bracing. The trainee will demonstrate the proper selection and installation of blocking, bracing, and dunnage. They must ensure wood grain runs lengthwise, verify that materials are free from defects, and install the structural bracing *before* applying tiedowns to prevent horizontal movement.

6.3.2. Tiedowns & Edge Protection. The trainee must demonstrate the ability to properly route, balance, and tension tiedowns across the cargo. The trainee must successfully apply required edge protection at all points where a tiedown (chain, strap, or wire rope) contacts the cargo, ensuring the material will resist crushing, cutting, and abrasion.

6.3.3. Specialized Cargo Scenarios. The trainer will set up scenarios requiring specialized securement. The trainee must demonstrate how to secure adjacent (side-by-side) cargo by placing items in direct contact or blocking the void spaces. Additionally, the trainee must demonstrate the securement of rolling cargo by providing at least two points of contact utilizing chocks, wedges, cradles, or by lifting the cargo off the deck.

6.4. Performance Evaluation. Once proficient, the trainee will complete the official cargo securement performance evaluation using the checklist found in Attachment 3. The trainer will review **Attachment 3** with the trainee and answer any final questions. During the evaluation, the trainer will ensure all safety, PPE, RM protocols, and securement standards are strictly observed. The trainee must complete the evaluation checklist—calculating WLL, applying blocking, routing tiedowns, and tensioning the load—with zero instructor assistance.

6.4.1. Retraining and Re-evaluation. If the trainee fails any portion of the evaluation (e.g., inadequate WLL, failure to use edge protection, or loose bracing), they will be issued a "No-Go." The trainer will critique the observed weaknesses and re-demonstrate the failed items. The trainee must re-perform the specific tasks until they show proficiency before an official re-evaluation is conducted.

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING

References

49 CFR Part 392, *Driving of Commercial Motor Vehicles*

49 CFR Part 393, *Parts and Accessories Necessary for Safe Operation*

49 CFR Subchapter C, *Hazardous Materials Regulation*

FMCSA, *Federal Motor Vehicle Carrier Safety Regulations Handbook*, February 2025

DoDM 4500.36, *Acquisition, Management, and Use of DoD Non-Tactical Vehicles*, 20 Dec 2018

DTR 4500.9, *Transportation and Traffic Management*, 29 May 2025

DAFI 90-802, *Risk Management*

DAFMAN 90-803, *Risk Management (RM) Guidelines and Tools*

QTP 24-3, *General Vehicle Safety*, 22 January 2026

QTP 24-3-HAZMAT, *Explosives/Hazardous Materials Transport*, 17 July 2025

Adopted Forms

DAF Form 623, *Individual Training Record Folder*

DAF Form 847, *Recommendation for Change of Publication*

DAF Form 1800, *Operator's Inspection Guide and Trouble Report*

Abbreviations and Acronyms

AFIMSC—Air Force Installation Mission Support Center

CFR—Code of Federal Regulations

DAFI – Department of Air Force Instruction

DoD—Department of Defense

DoDI—Department of Defense Instruction

DoDM—Department of Defense Manual

DoW—Department of War

DoT—Department of Transportation

FMCSA—Federal Motor Carrier Safety Administration

FNVSS—Federal Motor Vehicle Safety Standard

GCVW – Gross Combined Vehicle Weight

GMV—Government Motor Vehicle

GVWR—Gross Combined Weight Rating

IAW—In Accordance With

ITR—Individual Training Record

OJT—On-the-Job Training

PPE—Personal Protective Equipment

QTP—Qualification Training Package

RM—Risk Management

USC—United States Code

UTM—Unit Training Manager

VCO—Vehicle Control Official

WLL – Working Load Limit

Terms

Aggregate Working Load Limit—The summation of the working load limits of each device used to secure an article on a vehicle.

Anchor Point—The part of the structure, fitting, or attachment on a vehicle or article of cargo of which the tiedown is intended to be attached.

Article of Cargo—A unit of property to be carried on a motor vehicle, which may include individual items of cargo, or grouped items such as palletized cargo or containerized cargo.

Blocking—A structure, device or another substantial article of cargo placed against or around an article of cargo to prevent horizontal movement.

Bracing—A structure, device, or another substantial article of cargo placed against an article of cargo to prevent tipping, racking, or horizontal movement.

Direct Tiedown—A tiedown that goes directly from an anchor point on the vehicle to an anchor point on an article of cargo.

Friction Mat—A device placed between the deck of a vehicle and article of cargo, or between articles of cargo, that is intended to provide increased friction to prevent the cargo from sliding.

Indirect Tiedown—A tiedown which passes over or through an article of cargo and is anchored to the vehicle on both sides.

Rollingstock—Any vehicle or machine designed to move on wheels or tracks, including but not limited to heavy equipment, trailers, tractors, and military tactical vehicles.

Shoring Bar—A device placed transversely between the walls of a vehicle and cargo to prevent cargo from shifting.

Tiedown—A combination of securing devices which are attached to anchor points on a vehicle and are used to bind, fasten, or restrain an article of cargo.

Working Load Limit—The maximum allowable load (tension) that a securing device can withstand under normal operating conditions, as designated by its manufacturer.

Attachment 2

KNOWLEDGE TEST

1. The following transportation regulation(s) identify cargo securement requirements **except**:
 - A. Code of Federal Regulations (CFR)
 - B. DoDM 4500.36
 - C. Federal Motor Carrier's Safety Administration (FMCSA) Driver's Handbook
 - D. U.S. Cargo Control
2. What is the Gross Combined Vehicle Weight (GCVW) for a combination vehicle?
 - A. GCVW is the same as the Gross Vehicle Weight (GVW), they are interchangeable.
 - B. GCVW doesn't matter, only the GVW of the trailer matters.
 - C. GCVW is the curb weight of the truck and trailer plus with the total cargo weight.
 - D. GCVW is the number of tiedown points on a tractor trailer combination.
3. Immobilized cargo must meet one of which three conditions?
 - A. Fully contained, immobilized by structures, or immobilized or secured on or within a vehicle.
 - B. Fully contained, fastened to the deck of the trailer, or secured on or within a vehicle.
 - C. Partially contained, immobilized by structures, or immobilized or secured on or within a vehicle.
 - D. Partially contained, fastened to the deck of the trailer, or secured on or within a vehicle.
4. Oversize loads must be marked and may include any or all of the following items **except**:
 - A. Flashing lights
 - B. No markings are required if you have a valid permit
 - C. Orange or red warning/safety flags
 - D. Pilot and/or chase escorts
5. Direct tiedowns only count one-half (50%) of the Working Load Limit (WLL) for those tiedowns; indirect tiedowns count for the full value (100%) of the WLL for those tiedowns.
 - A. True
 - B. False
6. In accordance with CFR 393.106(d)(1), rollingstock must be secured using:
 - A. Blocking and bracing only
 - B. Indirect securement
 - C. Friction mats
 - D. Direct securement
7. How many tiedowns, at a minimum, are required for a piece of cargo that is 5 feet or shorter and 1,100 pounds or less?
 - A. 2 tiedowns
 - B. 1 tiedown
 - C. None, if there is some form of bed rail system i.e. stake bed.
 - D. None, friction will keep it from moving.

8. How many tiedowns, at a minimum, are required for cargo longer than 10 feet, no matter what the weight?
 - A. 1 tiedown every 4 feet, regardless of length
 - B. 2 tiedowns every 10 feet
 - C. 2 tiedowns every 10 feet, plus 1 additional beyond the first 10 feet.
 - D. The number of tiedowns depends on how many tiedown locations are on the trailer.
9. When using direct tiedowns, which approximate angle of lashing provides the greatest strength?
 - A. 60°
 - B. 45°
 - C. 30°
 - D. 25°
10. Indirect tiedowns are more effective when the angle of the securement device is steeper.
 - A. True
 - B. False
 - C. Does not apply
11. Anchor points include rub-rails rated by the manufacturer and chains running down the side of the trailer.
 - A. True
 - B. False
12. Lever style chain binders will only be tightened or released with:
 - A. A 4-foot piece of galvanized pipe
 - B. Any piece of pipe which does not flex
 - C. Nothing, lever style binders should never be used
 - D. A square-headed combination winch bar
13. A tiedown must be attached and secured in a way which allows the driver to tighten it during transport.
 - A. True
 - B. False
14. If the working load limit tag is faded or missing from a strap or ratchet strap it still has the same working load limit.
 - A. True
 - B. False
15. The maximum load that may be applied to a component of a cargo securement system during normal service, usually assigned by the manufacturer is the _____.
 - A. Working Load Limit (WLL)
 - B. Stationary Load Limit (SLL)
 - C. Rolling Load Limit (RLL)
 - D. Gross Vehicle Weight Rating (GVWR)

16. If the working load limit (WLL) of the binder is less than that of the chain, then the WLL of the binder, not the chain, will be used to determine the strength of the binder and chain together.
- A. True
 - B. False
17. Edge Protection must be used if a tiedown could be cut or torn when touching an article of cargo. The edge protection itself must also resist:
- A. Weather, chemicals, and/or UV rays
 - B. Water, dirt, and/or sand
 - C. Abrasion, crushing, and/or cutting
 - D. Abrasions, bulging, and/or cutting
18. Blocking and Bracing techniques should:
- A. Never be used
 - B. Be used to prevent the shifting or horizontal movement of cargo
 - C. Can only be done with metal pieces
 - D. Always be used no matter the cargo
19. Flatbed tarp(s) should primarily be secured to the trailer with:
- A. Bungee cords
 - B. Cargo straps over the tarp
 - C. Paracord
 - D. Wire rope
20. When are you required to check the securement of your cargo?
- A. Within the first 50 miles after loading, and then every 3 hours or 150 miles, whichever comes first.
 - B. Never, as long as the cargo is in a sealed (security seal) cargo area.
 - C. At the beginning and end of each day of driving.
 - D. All of the above
 - E. Only A and B

Knowledge Test Answers

1. D
2. C
3. A
4. B
5. A
6. D
7. B
8. C
9. D
10. A
11. B
12. D
13. A
14. B
15. A
16. A
17. C
18. B
19. A
20. D

Attachment 3

Figure A3.1 Performance Go-No-Go Test

PERFORMANCE TEST CHECKLIST	
Instructions to Certifier and Trainee: Pre-Test Briefing: The Certifier will review this entire checklist with the trainee and brief the intended road course route. The trainee must understand that all driving directions will be provided in sufficient time to execute maneuvers safely. Scoring Awareness: The Certifier will make various marks on this checklist during the evaluation. These marks do not inherently indicate a "No-Go"; the trainee must focus exclusively on safe vehicle operation. Conduct of Test: No Trainer or Certifier assists are permitted during the evaluation. Results will be explained to the trainee upon the conclusion of the test. Safety: The Certifier will stop the test immediately if unsafe operations occur or health concerns arise.	
SECTION I. TRAINEE AND CERTIFIER INFORMATION	
1. Trainee Name (Last, First MI)	2. Unit/Office Symbol
3. Certifier Name (Last, First MI)	4. Unit/Office Symbol
SECTION II. PERFORMANCE TEST INFORMATION	
5. Vehicle Management Code for Vehicle Tested	6. Date
SECTION III. SCORESHEET	
7. Equipment & Posture	Go No Go
Wears all required PPE; removes jewelry before starting	☐ ☐
Mounts/dismounts tractor & trailer safely using 3-point contact	☐ ☐
Identifies GCVW of tractor and load capacity of trailer	☐ ☐
Calculates cargo weights; explains load margins/overload status	☐ ☐
Identifies & places securing devices based on cargo length/weight	☐ ☐
Identifies state/country max cargo weight, width, & height limits	☐ ☐
Explains and demonstrates direct vs. indirect securement	☐ ☐
Identifies WLL/serviceability of straps, binders, chains, & hooks	☐ ☐
Identifies trailer securement points; demonstrates proper use	☐ ☐
Secures cargo/rollingstock IAW CFR 393.100-136; explains dunnage	☐ ☐
Identifies when edge protection is required; demonstrates placement	☐ ☐
Explains purpose and placement of oversize load signs and flags	☐ ☐
8. Remarks	
SECTION IV. CERTIFIER'S ENDORSEMENT	
I, the undersigned, do attest and certify that the trainee named herein has successfully completed all required training and is deemed proficient in the operation of cargo securement. This certification is made to the best of my knowledge and belief, based on training conducted pursuant to the approved qualification training package.	
9. Signature	10. Date