

Cargo Securement FLATBEDS

Introduction	
Pg. 1	<p>Welcome to Cargo Securement Flatbeds.</p> <p>To learn how to navigate this course, select the Next button now.</p>
Pg. 2	<p>The buttons at the bottom of your screen will help you navigate this course. Use the Back and Next buttons to go backward or forward through each lesson. Your first time through the course, you will not be able to skip ahead.</p> <p>After you go through the course once, you can use the menu to skip around and review for the exam. The Home button takes you back to the menu.</p> <p>Your progress through the course is tracked. If you must leave at any time, don't worry. You will be taken back to the same screen when you return.</p>
Pg. 3	<p>You can control the audio on each page using the Play/Pause button at the bottom of the screen.</p> <p>If you are taking the course in an area where you cannot hear the audio, you can download a printable audio transcript by selecting the Transcript button.</p>

Pg. 4	<p>The Resources button appears when additional learning tools like printable documents or web links are provided.</p> <p>Select the Resources button at the bottom of the page now to visit the JJ Keller website. The site will open in a new browser window and will not interfere with your movement through this course.</p> <p>If the site does not open, you may have a pop-up blocker enabled. We'll talk more about disabling pop-up blockers on the next page.</p> <p>Simply close the new browser window to return to the course.</p>
Pg. 5	<p>If you had trouble opening the JJ Keller link on the previous page, you may have a pop-up blocker. This course will not work correctly unless all browser-based and third-party pop-up blockers are disabled.</p> <p>Instructions for disabling pop-up blockers for Internet Explorer and Firefox are shown on the screen.</p> <p>You can also select the Resources button to download a PDF document with these instructions and additional instructions. The document also contains instructions to help you adjust your screen text size.</p>
Pg. 6	<p>The Video Player controls are detailed in the image on the screen.</p> <p>Use the Play/Pause button to start or pause the video.</p> <p>You can move to any part of the video by selecting and dragging the Progress Indicator forward or backward along the Progress Bar. Use Rewind to go back to the beginning of the video.</p> <p>The Maximize/Minimize button allows you to make the video larger. Maximizing the video will allow it to fill the content screen. Select the button again to minimize the video so that you can view the other screen content.</p>

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Pg. 7	<p>Check out the Course Highlights document for an overview of the interactive activities you'll find in this course.</p> <p>Download Course Highlights by selecting the Resources button on this page.</p>
Pg. 8	<p>When you select Next, you will begin the Pretest for this course. Your score will be reported to you, but will not be recorded. There are 5 questions in this pretest.</p>
Pg. 10	<p>By taking this course, you will learn:</p> <ul style="list-style-type: none">• Why cargo securement is important• About the Federal regulations and what they mean for drivers and carriers• How cargo securement affects your and your carrier's CSA scores• Key concepts like working load limit and direct versus indirect tiedowns• How to safely load and secure cargo• How to perform required pre-trip and en route flatbed and cargo inspections• And best practices for securing common commodities

Cargo Securement Overview	
Pg. 2	<p>You don't need much imagination to guess the likely outcome of poorly secured cargo on a flatbed:</p> <ul style="list-style-type: none">• Damage to cargo• Delays due to roadside enforcement• Increased insurance rates due to violations or lawsuits• Loss of the load• Damage to vehicles and other property• And, most importantly, serious injuries or loss of life—not the kind of thing you want on your conscience when you go to bed at night!
Pg. 3	<p>Everyone who pulls a flatbed for a living knows that properly securing the cargo to the trailer is the key to safe—and profitable—operation.</p> <p>The most critical threat, however, is the very real possibility that poorly secured cargo can be the cause of serious injury or death for flatbed drivers or the motoring public.</p>

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Pg. 4	<p>The Federal Motor Carrier Safety Administration—or the FMCSA—has made cargo securement a critical point of emphasis in the regulations and in its enforcement activities.</p> <p>In the U.S., drivers must follow the rules in Part three ninety-three, Subpart I ("EYE") of the Federal Motor Carrier Safety Regulations, or FMCSR.</p> <p>And, when in Canada, drivers must comply with the National Safety Code Standard 10 and provincial standards.</p>
Pg. 5	<p>In addition to federal requirements, you must also be aware of individual state regulations. For state regulations, you should be concerned with gross vehicle and individual axle weights, cargo securement and cargo cover requirements.</p>
Pg. 6	<p>The regulations say that you must not operate a commercial motor vehicle if the load isn't properly secured.</p> <p>The regs also state that a motor carrier must not allow a driver to transport a load that isn't properly secured.</p> <p>So the regs put the responsibility for properly securing the load on both you and your carrier.</p>
Pg. 7	<p>CSA (or, Compliance, Safety, Accountability) is an FMCSA enforcement program.</p> <p>It recognizes the shared responsibility between you and your carrier for cargo securement.</p> <p>Select the Resources button below to visit the CSA website.</p>

Pg. 8	<p>Under the CSA enforcement program, violations for improperly secured cargo are recorded in both the driver's and the carrier's CSA scores.</p> <p>Approximately 100 cargo securement violations are tracked in CSA.</p> <p>Many of these violations carry a high severity.</p> <p>These scores have a significant impact on both a driver's and a carrier's ability to continue to earn a living in this industry.</p>
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Pre-Trip Planning	
Pg. 2	<p>Securing the load on your flatbed trailer doesn't begin after cargo's loaded onto the deck. It begins with pre-trip planning.</p> <p>Some key concepts that you need to understand in order to develop a load securement plan are</p> <ul style="list-style-type: none">• Working load limit, or WLL,• Aggregate working load limit, and• Indirect and direct tiedowns

Pg. 3	<p>The working load limit is the maximum load that may be applied to a component of a cargo securement system, like a chain, during normal service. If a heavier load is applied, the component could fail.</p> <p>Working load limit is sometimes referred to as the restraining capacity.</p> <p>To find the working load limit</p> <p>Look at the component. Manufacturers can use codes or symbols to show WLL on a component. Make sure you understand the code before using the device.</p> <p>Check the regulations, which have tables showing the default working load limits for tiedowns.</p> <p>Ask for information from your carrier.</p> <p>Never use a securement device based on your own or anybody else's best guess.</p>
Pg. 4	<p>Select Play now to watch a video explaining where to find WLL marked on tiedown devices.</p> <p>[Video from frames 22 and 23]: This 4-inch synthetic webbing has a working load limit of 5,400 pounds. In fact, it's marked right here.</p> <p>This chain has a working load limit of 4,700 pounds. This is based on the chain being marked with G-70—indicating that it's a Grade 70 transport chain, and 5/16—indicating the size.</p>

Pg. 5	<p>Now let's consider the aggregate working load limit, which is the combined load-carrying capacity of a group of tiedown devices.</p> <p>Calculating the aggregate working load limit depends on how the tiedowns are used to secure the load.</p> <p>There are two types of securement:</p> <p>indirect tiedowns</p> <p>and direct tiedowns.</p>
Pg. 6	<p>It is called an indirect tiedown when</p> <p>it is routed through, over, or around the cargo and</p> <p>the ends of the device are attached to opposite sides of the trailer.</p>
Pg. 7	<p>Direct tiedowns have</p> <p>One end attached directly to the cargo, or</p> <p>Both ends attached to the same side of the trailer.</p> <p>Select Play now to watch a video illustrating the difference between direct and indirect tiedowns.</p>
Pg. 9	<p>When using indirect tiedowns, calculate the aggregate working load limit by adding 100 percent of the working load limit of each tiedown device.</p> <p>Take a look at this indirect tiedown example.</p> <p>Imagine you're using two straps with a working load limit of 4,000 pounds each.</p> <p>Add 4,000 plus 4,000. So the aggregate WLL is 8,000 pounds.</p>

Pg. 10	<p>Calculate the aggregate working load limit of direct tiedowns by adding half (or 50 percent) of the working load limit of each tiedown device.</p> <p>Take a look at this direct tiedown example.</p> <p>Imagine again that you're using two straps with a working load limit of 4,000 pounds each.</p> <p>Add together half, or 50 percent, of the working load limit of each tiedown.</p> <p>That would be 2,000 plus 2,000 for an aggregate working load limit of 4,000 pounds.</p>
Pg. 13	<p>Before loading begins, review the shipping information to determine the type of load you'll be hauling and the weight of that load.</p> <p>This will enable you to develop a plan for</p> <p>how the weight will be distributed on the trailer,</p> <p>the types and number of tiedowns you'll need,</p> <p>and where those tiedowns will be placed and anchored.</p>
Pg. 14	<p>To determine the number of tiedowns needed, you need to know the:</p> <ul style="list-style-type: none">• Weight of the cargo,• Working load limit of the tiedowns,• Tiedown attachment method (direct or indirect),• And the length and positioning of the cargo.

Pg. 15	<p>How do you use the working load limit and cargo weight information?</p> <p>Under the regs, the aggregate working load limit must equal at least half, or 50 percent, of the weight of the cargo being secured.</p>
Pg. 16	<p>Let's look at our indirect tiedown example again.</p> <p>Our two 4,000 pound straps have an aggregate working load limit of 8,000 pounds.</p> <p>So they could secure a load of up to 16,000 pounds.</p>
Pg. 17	<p>Now let's look back at the example with direct tiedowns.</p> <p>Our two 4,000 pound straps have an aggregate working load limit of 4,000 pounds.</p> <p>So they could secure a load of up to 8,000 pounds.</p> <p>In other words, you would need twice as many direct tiedowns to secure as much cargo as indirect tiedowns.</p>
Pg. 19	<p>Knowing the weight of your cargo is critical for:</p> <p>determining the working load limit of the tiedowns you'll use and the minimum number of tiedowns you need for your load,</p> <p>and in deciding on the cargo securement method you should use.</p>
Pg. 20	<p>When using tiedowns, your goal is to immobilize the cargo, so that it can't shift in any direction.</p> <p>Remember, when you use devices to secure cargo, the aggregate working load limit of those devices must be at least half of the weight of the cargo being secured.</p>

Pg. 21	<p>Let's look at an example. If an article of cargo weighs 50,000 pounds, the aggregate working load limit of the devices used to secure that cargo must be at least 25,000 pounds.</p> <p>If you use indirect tiedowns, you could use four Grade 70 chains or seven 4-inch straps.</p> <ul style="list-style-type: none">• For chains, use four Grade 70 chains with a working load limit of 6,600 pounds each. In this case, the aggregate working load limit is 26,400 pounds, which is 1,400 pounds more than necessary.• For straps, use seven 4-inch straps with a working load limit of 4,000 pounds each. In this case, the aggregate working load limit is 28,000 pounds, which is 3,000 pounds more than necessary.
Pg. 22	<p>If you use direct tiedowns, using the same example that requires an aggregate working load limit of at least 25,000 pounds, you could use eight Grade 70 chains or thirteen (13) four (4)-inch straps. Remember with direct tie-downs you can only count half of the working load limit of each device.</p> <ul style="list-style-type: none">• For chains, use eight Grade 70 chains with a working load limit of 6,600 pounds each. Half of the working load limit of each would be 3,300 pounds. 3,300 times eight is 26,400 pounds, which is 1,400 pounds more than necessary.• For straps, use thirteen (13) four (4)-inch straps with a working load limit of 4,000 pounds each. Half of the working load limit of each device would be 2,000 pounds each. 2,000 times 13 is 26,000 pounds, which is 1,000 pounds more than necessary.

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Pg. 23	<p>Now that you know how many tiedowns you need for the weight of your cargo and the securement method, you need to consider when you might need additional tiedowns</p> <p>due to the overall size of the cargo</p> <p>and its position on the trailer.</p>
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Pg. 24	<p>You will need additional tiedowns if the cargo is not prevented from moving forward. To determine the number of tiedowns, you'll need to consider both the length <i>and</i> the weight of the cargo.</p> <p>Cargo may be prevented from moving forward by a header board, bulkhead, secure chocks or other secured cargo.</p> <p>The additional tiedowns that are used to block forward movement are sometimes called "penalty straps."</p> <p>Select Play now to watch an animation explaining the additional tiedowns required to prevent forward movement.</p> <p>[Video VO]</p> <p>If the object is 5 feet or shorter and weighs less than 1,100 pounds, one tiedown is required.</p> <p>If it's 5 feet or shorter and weighs over 1,100 pounds, two tiedowns are required.</p> <p>If the object is longer than 5 feet, but shorter than 10 feet—no matter the weight—at least two tiedowns are required.</p> <p>If the object is longer than 10 feet, two tiedowns are required—plus an additional tiedown for every additional 10 feet or part thereof.</p> <p>So a twelve-foot object, for example, would need three tiedowns—two for the first ten feet and one for the remaining two feet, spaced as necessary to secure the cargo.</p> <p>When the cargo is prevented from forward movement, you need one tiedown for every 10 feet of cargo length, or part thereof.</p>
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Pg. 25	<p>The minimum number of tiedowns needed is published in the regulations, and if you're unclear on what is required for your specific cargo, check the regs.</p> <p>Your company or the shipper may also provide materials that indicate preferred tiedown techniques for specific types of cargo.</p>
Pg. 26	<p>And, here's an important point: The regulations are the minimum standard you must meet.</p> <p>However, it's often a good idea to use additional tiedowns—beyond those required by the regulations—to establish an additional margin of safety.</p> <p>Keep in mind, if the extra tiedowns you use are damaged in any way, you can still be cited for using improper tiedowns, even though you viewed them as extras,</p> <p>so make sure that they are in good shape and stay tight, just like the required tiedowns.</p>
Pg. 27	<p>On the next screen, you'll get to see these regulations in action with an indirect tiedown calculator.</p> <p>You'll choose the type of tiedown to use, select the length and weight of your load and decide whether the load is secured with a bulkhead.</p> <p>Then, you'll select Calculate to see how many indirect tiedowns you need to secure that load.</p> <p>Try securing the same load with other types of indirect tiedowns to see how the results change.</p> <p>Select Next to use the indirect tiedown calculator.</p>

Pre-Trip Responsibilities

Pg. 2

Once you've completed your pre-trip planning, it's time to carry out your pre-trip responsibilities.

Your main pre-trip responsibility is to do what is best and safest for you, your cargo and others on the road.

Select **Play** to watch a video outlining how to perform the initial "walk-around" inspection of your vehicle.

[Video VO]

It's smart to do an initial "walk around" to ensure that all anchor points are in good condition and that the deck of your trailer isn't damaged or worn in a way that could jeopardize your ability to secure cargo properly.

This will include a walk on the deck to look for fluid spills, debris, or anything that might create a slick spot and cause cargo to slide or become damaged. Check for rocks, nails, protrusions of any sort that could damage the cargo or affect your ability to effectively secure the cargo.

And while you're inspecting the deck, also look for holes or loose seams that could lead to cargo being damaged by weather or road spray.

If you know you'll be covering your load with a tarp, consider how you'll secure the tarp so that tiedowns are accessible for inspection and adjustment.

You should also inspect the tiedown devices—including any chains or webbing—that you intend to use to secure the cargo.

You should ensure that your tiedowns are strong enough for your

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	<p>expected cargo and that all tiedowns you intend to use are in good condition. Webbing shouldn't be cut, frayed or otherwise damaged, and chain links should not be damaged or deformed.</p> <p>If you're going to use tarps, make sure they're in good condition as well.</p>
Pg. 4	<p>When you transport cargo on public roads, you must load and prepare your vehicle to prevent any of the following from happening to the cargo during the trip:</p> <ul style="list-style-type: none">• Leaking, spilling, blowing or falling from the motor vehicle.• Shifting in a way that affects the vehicle's stability or your ability to safely maneuver it.
Pg. 5	<p>As the cargo is loaded, see that the distribution of weight is appropriate and that the height of the load will not create center-of-gravity problems.</p> <p>If you are unfamiliar with placing and securing the type of cargo being loaded, ask the customer or someone at your company, such as the safety person or a driver trainer, about best securement practices and techniques.</p>

Pg. 6	<p>In some instances, the shipper may do the loading. When this is the case, you are still responsible for the security of the cargo.</p> <p>You are the one who may face a roadside inspection – and a hit to your CSA score – so you need to be satisfied with</p> <p>the weight distribution,</p> <p>the height,</p> <p>and the securement devices used <i>before</i> you leave the shipper’s yard.</p> <p>Remember that cargo securement violations affect your and your carrier's CSA scores. Select the Resources button below to visit the CSA website for more information about CSA scores.</p>
Pg. 7	<p>As you observe or supervise the loading process, keep safety in mind. Do not stand under items being lifted by a forklift or crane.</p> <p>And do not stand on the opposite side of the trailer in a way that places you in danger when an item is being loaded by a forklift or crane.</p>
Pg. 8	<p>When attaching devices to the flatbed, use proper attachment points.</p> <p>In most cases, this does not include the rub rail. Rub rails are designed to protect the tiedowns and the deck from damage that may be caused by “rubbing” the trailer up against fixed objects.</p> <p>And be sure to keep all securement devices inside the rub-rail whenever possible. It defeats the purpose of the rub-rail if a strap is outside the rail where it can be damaged by rubbing against loading docks, doorframes or other objects.</p> <p>Also, use edge protection to protect the securement device from the cargo, or the cargo from the securement device, when necessary.</p>

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Pg. 9	<p>When tightening straps and chains, pull don't push.</p> <p>Do not use an extension, or cheater, bar to tighten tiedowns.</p> <p>Be aware of pinch points, such as between the cargo and trailer and the chains or straps, and those created when tightening winches and binders.</p> <p>Always wear a hardhat, gloves, and safety glasses during the securement process.</p>
Pg. 10	<p>Know how to operate and tighten all the devices that you will be using to secure the load.</p> <p>When tightening straps and chains, pull down on the lever rather than pushing. This is safer and gives better control.</p> <p>When using lever- or ratchet-type binders, make sure that the binders you're using are rated at the same strength or higher than the chain.</p> <p>Do not operate securement devices such as chain binders while standing on the trailer or load. It's far safer to be standing firmly on the ground when tightening straps or chains.</p> <p>Make sure that any extra strap or chain is secured and not left dangling.</p>
Pg. 11	<p>You should also be aware of the "recoil" potential with some devices. Avoid being in a position where you could be struck by a securement device.</p> <p>Winches, binders and even something as simple as a bungee cord can store energy and "snap" back or recoil without warning, causing serious injury.</p>

Pg. 12	<p>After you secure your cargo, you will sometimes need to cover it with a tarp.</p> <p>Select Play to watch a video explaining some rules for covering loads with a tarp.</p> <p>[Video VO]</p> <p>When you know you'll be covering the load with a tarp, it's a good idea to put the tarp on the last item to be loaded or to ask the lift operator to set the tarps on the top of the load after loading is completed. That way the forklift can be used to get both the cargo and the tarps into the proper position safely.</p> <p>As you spread the tarp over the load, avoid walking on the tarp whenever possible. While walking on the trailer deck, make sure you have solid footing wherever you're putting your feet down. Falling off the vehicle while securing cargo can cause serious injuries. And, just in case you haven't heard it enough times for it to sink in, remember "three points of contact" whenever climbing up or down.</p>
Pg. 14	<p>After you've secured the load, or the shipper has secured the load to your satisfaction—but before you begin your trip—the regs call for the first formal inspection.</p> <p>This pre-trip inspection should include all the basics, plus checking each tiedown, adjusting cargo or securement devices as necessary, and adding more devices if needed. If the shipper secured the load, be prepared to inform them if securement is not adequate, and only begin your trip when you are satisfied that the cargo is secured safely.</p>

Pg. 15	<p>Additional inspections are required within the first 50 miles, and then again every time you stop or park,</p> <p>or every three hours</p> <p>or 150 miles—whichever comes first.</p> <p>Select Play to watch a video depicting an en route inspection.</p> <p>[VIDEO VO]</p> <p>When conducting en route inspections, “think safety.”</p> <p>Conduct the inspection off the road, like at a rest area or truck stop, away from high-traffic areas.</p> <p>Wear a brightly colored safety vest so that you’re highly visible to other drivers.</p> <p>Never turn your back to on-coming traffic while you’re inspecting cargo and securement devices. If you must turn your back, do it on the non-traffic side of the vehicle. When you’re on the traffic side of the vehicle, stay hyper-alert and be prepared to dive under the trailer as a possible escape route.</p> <p>During your inspections, look for tiedowns that have become loose or may be damaged by rubbing or vibration. Also look for cargo that may have shifted. Be prepared to adjust the tiedowns or add additional tiedowns to ensure that the cargo cannot move.</p> <p>Finally, be sure to properly stow all equipment—including winch bars and dunnage boards—before continuing down the road.</p>
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Common Commodity Types	
Pg. 2	<p>We can't cover every load securement situation you may encounter. But, there are some common commodity types specifically mentioned in the regulations which require specialized knowledge to secure. Here we'll consider five types of commodities that are commonly hauled on flatbeds.</p> <p>The list includes; heavy equipment, lumber and building materials, metal coils, concrete pipe and logs.</p>
Pg. 3	<p>Securement of heavy equipment can present some challenges. When securing equipment that operates on wheels or tracks and weighs at least 10,000 pounds, be sure to verify the following requirements:</p> <ul style="list-style-type: none">• First, as you would with any cargo, determine the weight of the equipment and the weight of your vehicle to ensure that the gross combination weight will not be exceeded.• From there, you can determine the correct placement of cargo on the trailer.• Knowing the weight of the cargo will also help you determine how many tiedowns you'll need.• If the load is oversized, determine your route and obtain any necessary permits.
Pg. 4	<p>Before loading, determine where the equipment will be placed on the trailer.</p> <p>Take into consideration weight distribution, how many tiedown anchors are available, and the loading methods approved by the trailer's manufacturer.</p>

	<p>When loading heavy equipment onto the flatbed, only operate vehicles and equipment that you have been trained on. Leave driving the equipment onto the trailer to trained operators.</p> <p>If you see dirt or debris, clear it away. Make sure it does not interfere with securement and won't fall off during the trip.</p>
Pg. 5	<p>Before you secure the load:</p> <p>Lower all accessory equipment such as shovels or loaders.</p> <p>Set parking brakes.</p> <p>Set steering locks and articulation locks to prevent movement during transport. If articulation locks or travel locks are not present on the equipment, you'll have to use chains or straps to immobilize the equipment.</p>
Pg. 6	<p>The regulations do not specify that chain must be used for tiedowns, but chain is the preferred tiedown method due to its strength and durability.</p> <p>And many types of heavy equipment have specific attachment points for chains.</p> <p>As with any cargo, your goal is to immobilize the equipment, preventing movement both front-to-back and side-to-side. At a minimum the regulations require four tiedowns.</p> <p>In all cases, the aggregate working load limit of your tiedowns must equal half or 50 percent of the cargo's weight.</p>

Pg. 7	<p>When securing heavy equipment, be sure to follow these guidelines:</p> <p>Use tiedowns to secure all accessory equipment to the vehicle</p> <p>Use at least four tiedowns for equipment with crawler tracks or wheels, in addition to the tiedowns used on accessory equipment</p> <p>Attach each tiedown as close as you can to the front and rear of the vehicle</p> <p>The aggregate working load limit of the tiedowns must equal at least one-half of the weight of the equipment</p>
Pg. 8	<p>If the equipment you'll be hauling includes a vehicle that has tires, be aware that it could bounce.</p> <p>Select Play to watch a video explaining the extra precautions you should take for transporting equipment with tires.</p> <p>[Video VO]</p> <p>Adding direct tiedowns near each wheel, in addition to those required for securement, is a good practice.</p> <p>Using chocks, cradles or wedges against wheels is also a useful practice to prevent rolling.</p> <p>During en route inspections, pay special attention to tires on the vehicle that you're hauling. If they have lost air, you'll need to adjust the nearby tiedowns. Tires that lose air can loosen the tiedowns and make them ineffective.</p>

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Pg. 9	<p>Finally, be aware that earth moving machinery and farm implements often have hydraulic hoses routed across surfaces where you may be tempted to place tiedowns.</p> <p>Be sure to use tiedowns only in areas where there are no hydraulic hoses.</p> <p>If that's not possible, do what you can to protect hoses from damage that may be caused by vibration, pressure, or abrasion from the tiedowns.</p>
Pg. 11	<p>Now, let's look at lumber and building materials. Dressed lumber and building materials such as plywood, drywall or shingles are typically transported as bundles on flatbed trailers.</p> <p>When calculating the number and type of tiedowns required for these kinds of loads, the rules of general cargo securement related to weights and lengths apply—but there are some special considerations.</p>
Pg. 12	<p>For example, when bundles are loaded side-by-side they should be loaded in a way that prevents side-to-side movement.</p> <p>To minimize side-by-side movement,</p> <p>place the bundles in direct contact with each other.</p> <p>You can also put dunnage or blocking between the bundles to prevent shifting.</p>

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Pg. 13	<p>Select Play to view a video demonstrating the handling of stacked bundles.</p> <p>[Video VO]</p> <p>When bundles are stacked, they can be placed directly on top of lower bundles or stacked on spacers. When there are two tiers of cargo, the stacks can be secured with tiedowns over the top tier using general cargo securement rules.</p>
Pg. 14	<p>For three tiers of stacked bundles, use tiedowns for the middle and top tiers.</p> <p>For more than three tiers, use tiedowns for the top tier and one of the middle tiers. Make sure that the middle tier you use is no more than 6 feet high from the deck to the top of the tier.</p> <p>For increased safety, especially when stacking bundles, be sure to place them against a bulkhead or front-end structure on the trailer whenever possible.</p>
Pg. 15	<p>If tiedowns might damage the cargo, or if abrasions by the cargo might damage tiedowns, be sure to use edge protection.</p>

Pg. 17	<p>Flatbed trailers are often used to transport coils of metal, wire or cable. These coils can include items such as metal, metal foil, metal leaf, forged metal, stamped metal, metal wire, metal rod and metal chain packaged as a roll, coil, spool, wind or wrap.</p> <p>When these coils weigh less than 5,000 pounds they may be secured according to general securement requirements.</p> <p>But, when they weigh more than 5,000 pounds, there are specific requirements for their securement. For this discussion, we'll be describing techniques for securing coils weighing 5,000 pounds or more.</p>
Pg. 18	<p>There are three ways to orient coils on a flatbed. The three methods are:</p> <ul style="list-style-type: none">• Eyes vertical, also known as "eyes upward"• Eyes crosswise• Eyes Lengthwise

Pg. 19	<p>When transporting coils eyes upward, remember, it's critical to prevent the cargo from moving front-to-back as well as side-to-side. And, the coil must also be prevented from tipping.</p> <p>Select Play to watch an animation explaining how to transport coils in the "eyes-upward" position.</p> <p>[Video VO]</p> <p>To prevent tipping, at least one tiedown should run diagonally across the eye from the left side of the trailer to the right side of the trailer and at least one tiedown should be run diagonally from the right side of the trailer to the left side. These two tiedowns should form an "X" over the eye. A third tiedown should run over the eye from one side of the trailer to the other. When secured, these three tiedowns should prevent the coil from tipping or side-to-side movement. Forward and rearward movement can be prevented by using blocks, bracing or friction mats. For extra security, you can pass one tiedown around the front of the coil and one tiedown around the back. For a group of coils with vertical eyes, attach one tiedown to prevent the front row from moving forward and one to prevent the back row from moving rearward.</p>
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Pg. 20	<p>Select Play to watch an animation explaining how to transport coils in the "eyes-crosswise" position.</p> <p>[Video VO]</p> <p>When transporting a coil with the eyes crosswise, you must prevent it from rolling by using timbers, chocks, cradles or wedges held in place by coil bunks or racks, or a similar device. Pay special attention to the security of these devices during your pre-trip and en route inspections. Further, you must attach at least one tiedown through the eye of the coil to prevent forward motion and one tiedown through the eye to prevent rearward movement, but these tiedowns must not cross (to form an "X" pattern). Whenever possible, the angle between these tiedowns and the deck of the trailer should be less than 45 degrees. Securing groups of metal coils that are loaded next to each other with the same orientation is similar to securing a single coil. The coils should be arranged on the trailer so that they assist in holding each other in place. Usually this means that the coils are touching one another or that blocking, bracing, or dunnage is used to fill the spaces between the coils. .</p>
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Pg. 21	<p>Select Play to watch an animation explaining how to transport coils in the "eyes-lengthwise" position.</p> <p>[Video VO]</p> <p>Transporting a coil with the eyes lengthwise also requires preventing the coil from rolling by using timbers, chocks, cradles or wedges held in place by coil bunks or similar devices. Further, the coil should be secured by one tiedown running side-to-side over the top of the coil and two tiedowns running either straight or diagonally through the eye and anchored on the sides of the vehicle. Another option to prevent rolling is to run two tiedowns over the top of the coil and use blocks or friction mats to prevent forward movement.</p>
Pg. 22	<p>For groups of coils with eyes crosswise or lengthwise, the procedure is similar to securing single coils. Each coil should be blocked from rolling and multiple tiedowns should be used just as you would for individual coils. Tiedowns or blocking should be used to prevent forward and rearward movement as well.</p>
Pg. 23	<p>When securing coils on your flatbed, it's always important to use the proper number –and placement–of tideowns.</p> <p>In this activity, you will need to select the proper placement of tiedowns for coils in the three main positions: eyes vertical (or "eyes upward"), eyes-crosswise, and eyes lengthwise.</p> <p>Select Next to continue.</p>

Cargo Securement FLATBEDS

Pg. 33	<p>Securing concrete pipe is similar to securing metal coils. Like metal coils, concrete pipe should be prevented from rolling using timbers, chocks, cradles or wedges.</p> <p>When preparing to transport multiple pieces, load the pipe as compactly as possible and use both blocking and tiedowns to immobilize the pipe.</p>
Pg. 34	<p>Pipes of different sizes should be loaded and secured as separate groups.</p> <p>The aggregate working load limit of all tiedowns on any group of pipes must be at least half or 50 percent of the total weight of the pipes in the group.</p>
Pg.35	<p>To prevent movement of stacked concrete pipe, tiedowns that meet the weight and length requirements of the cargo should be run through or over the pipe in the upper tier and firmly anchored to the trailer.</p>
Pg. 36	<p>Select Play to watch a video explaining the specifics for using tiedowns based on the pipe diameter.</p> <p>[Video VO]</p> <p>If the pipe is less than 45 inches in diameter, the front-most and rear-most pipes in the lower tier should have a tiedown running through the pipe that is secured on both the left and right sides of the trailer.</p> <p>If the pipe is more than 45 inches in diameter, every pipe will need to have a tiedown running through the pipe, secured on both the left and the right side.</p>
Pg. 37	<p>Where possible, the front tiedown should be secured toward the rear at an angle of less than 45 degrees and the rear tiedown should be secured toward the front at a similar angle.</p>

Pg. 38	<p>Concrete pipes with bells present a special challenge.</p> <p>Select Play to watch a video that explains how to load these commodities in either one or two tiers.</p> <p>[Video VO]</p> <p>When loading concrete pipes with bells in a single tier, they should be arranged so that the bells alternate on opposite sides of the vehicle. This allows the pipes to fit snugly together, reducing the chance of movement.</p> <p>If you're loading on two tiers, the bells of the pipes on the lower tier should be on one side of the trailer while the bells on the upper tier should be on the opposite side. This allows for the snugest fit possible vertically.</p> <p>After the bell pipe is loaded, secure it using the same techniques as you would use with straight concrete pipe.</p>
Pg. 40	<p>Logs are another commodity that require special attention and have their own set of regulations.</p> <p>Under these regulations, the term "logs" applies to any natural wood that retains its original shape. This includes raw trees, partially processed trees, such as de-barked logs, and fully processed trees, such as utility poles or log cabin components.</p> <p>If your load has four or fewer processed logs or processed logs that are banded together, you can secure them using the general cargo-securement requirements.</p>

Pg. 41	<p>When transporting logs, you must use a vehicle that's designed and built specifically for hauling logs. You won't use a standard flatbed.</p> <p>These special vehicles have devices such as bunks, bolsters, stakes and standards. These devices cradle the logs and prevent them from rolling. Further, all components must be designed to withstand anticipated operational forces without failing or deforming.</p>
Pg. 42	<p>When packing logs, follow these requirements:</p> <p>Logs must be solidly packed.</p> <p>Outer bottom logs must be in contact with side supports such as bunks, bolsters, stakes or standards.</p> <p>Each outside log on the side of a stack must touch at least two side supports. If it does not, make sure that the log rests solidly on other logs and extends farther than the side supports.</p> <p>Verify that the center of the highest log on each side or end is below the top of each side support.</p>
Pg. 43	<p>Groups of more than four logs that are not in a crib-type log trailer must be tied down unless they're held in place by other logs or by side supports.</p> <p>The aggregate working load limit for the tiedowns used to secure the stack of logs must be at least one-sixth the weight of the stack of logs.</p> <p>Clearly, this means you must calculate the weight of your load and know the working load limit of your securement devices to determine the number of tiedowns required.</p>

Pg. 44	When logs become slippery due to rain, ice or snow, additional tiedowns beyond those for general securement are required.
Pg. 45	<p>Under some circumstances, shorter logs, called shortwood, measuring between 100 in. and 16 ft. long, are loaded crosswise on frame, rail or flatbed vehicles.</p> <p>[Video VO]</p> <p>When this is the case, the end of a log in the lower tier must not extend more than one-third of the log's total length beyond the nearest supporting structure. Two tiedowns must be used to secure each stack of shortwood loaded crosswise. These tiedowns must meet the aggregate working load limit requirements for transporting logs, must attach to anchor points at the front and rear of the load and must be positioned at approximately one-third and two-thirds the length of the logs. For vehicles over 33 feet in length, the tiedowns can be fixed on the ends and tensioned at the middle, or fixed in the middle and tensioned at the ends. Or, they can run the length of the load with a pulley device in the middle and be tensioned at one of the ends.</p>
Pg. 46	<p>When you load two stacks of shortwood side-by-side, follow these rules:</p> <ul style="list-style-type: none">• Make sure that there is no space between the two stacks.• Make sure that the outside of each stack is raised at least 1 inch, within 4 inches of the end of the logs or from the side of the vehicle, so the stacks slope inward.• Be sure that the highest log is 8 feet or less above the deck.• Use at least one tiedown lengthwise across each stack.

Pg. 47	<p>There are specific options in the regulations for securing logs that are loaded in LENGTHWISE stacks.</p> <p>If you'll be transporting this kind of load, consult the regulations to ensure that you're in compliance.</p>
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Conclusion	
Pg. 2	<p>As a professional flatbed driver, you're responsible for transporting a variety of important cargo on the nation's highways.</p> <p>A key part of this responsibility is ensuring that whatever you're transporting is secured in a way that protects the cargo, the vehicle and the public.</p> <p>Training is only part of that responsibility.</p> <p>You must also understand the regulations, master the techniques and recognize the potential hazards related to cargo securement in your everyday work.</p>

Pg. 3	<p>You must also be willing to ask questions, learn new methods and look critically at the loading of any cargo you're scheduled to transport.</p> <p>When it comes to cargo securement, there is no room for messing up, no room for second chances. If a strap or a chain fails while you're driving down the road or making a turn, you're the one who has to live with the consequences: damaged cargo, lost time, increased insurance rates, high CSA scores or worse.</p> <p>By committing yourself to expanding your knowledge of cargo securement and using that knowledge on every load, you can ensure that you get it right every time.</p>
Pg. 4	<p>By now, you should have learned:</p> <ul style="list-style-type: none">• Why cargo securement is important,• About federal regulations and what they mean for drivers and carriers,• How cargo securement affects your and your carrier's CSA scores,• Key concepts like working load limit and direct vs. indirect tiedowns,• How to safely load and secure cargo,• How to perform required (pre-trip, en route) flatbed and cargo inspections,• And best practices for securing common commodities.

Pg. 5	<p>Now that you have covered everything in the course, it's time to review for the exam. To help you prepare for the exam, you can now move back and forth within the course. Use the Home button or the Back and Next buttons at the bottom of the screen.</p> <p>The review questions will also help you review main concepts covered on the exam. Select Next to continue to a page where you can download the questions.</p>
Pg. 6	<p>The review questions will open in a separate window. Keep the original window open. That way if you don't know an answer, you can go back into the course and find it.</p> <p>Once you've finished the review questions and have finished studying, continue on to take the final exam. To begin the review questions, click the Resources button.</p>
Pg. 7	<p>Now it's time to take the final exam. This exam includes 15 questions. If you close the exam before finishing, your answers will not be saved for later.</p> <p>You will have three chances to take the final exam. Your highest score will be recorded.</p> <p>To begin the exam, select Next.</p>
Pg. 9	<p>Congratulations! You have completed this course.</p>