



## Cargo Securement – General Overview

Monthly Training Topic  
NV Transport, Inc.  
Safety & Loss  
Prevention



# Purpose of Cargo Securement

*The purpose of this presentation is to learn how to:*

- ◆ *Apply the securement requirements in the North American Cargo Securement Standard.*
- ◆ *Safely load and secure your commodities*
- ◆ *Inspect a secured load for compliance with the North American Cargo Securement Standard*

**North American Cargo Securement Standards can be found in the  
Federal Motor Carrier Safety Regulations**

*Why is it so important to properly secure cargo? An improperly secured load can result in:*

- ◆ *Loss of life*
- ◆ *Loss of load*
- ◆ *Damage to the cargo*
- ◆ *Damage to the vehicle*
- ◆ *Issuance of citations/fines to driver/carrier*
- ◆ *The vehicle being placed Out-of-Service.*



# Why is it so important to properly secure cargo?



# Cargo Securement

***A driver may not operate a commercial motor vehicle and a motor carrier may not require or permit a driver to operate a commercial motor vehicle unless:***

- ***The commercial motor vehicle's cargo is properly distributed and adequately secured as specified in FMSCA Regulations 393.100 through 393.136***
- ***The commercial motor vehicle's tailgate, tailboard, doors, tarpaulins, spare tire and other equipment used in its operation, and the means of fastening the commercial motor vehicle's cargo, are secured***
- ***The commercial motor vehicle's cargo or any other object does not:***
  - ***Obscure the driver's view ahead or to the right or left sides (except for drivers of self-steer dollies)***
  - ***Interfere with the free movement of his/her arms or legs, prevent his/her free and ready access to accessories required for emergencies***
  - ***Prevent the free and ready exit of any person from the commercial motor vehicle's cab or driver's compartment***

# Protection against shifting Cargo – General Requirements

***The rules in this section are applicable to the transportation of 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)***

***Each commercial motor vehicle must, when transporting cargo on public roads, be loaded and equipped, and the cargo secured to prevent the cargo from leaking, spilling, blowing or falling from the motor vehicle.***

***Cargo must be contained, immobilized or secured to prevent shifting upon or within the vehicle to such an extent that the vehicle's stability or maneuverability is adversely affected.***



# Commodity-Specific Securement Requirements

***Commodity – specific rules can be found in sections 393.116 through 393.136. The commodity – specific rules supersede the general provisions.***

***FMCSA has adopted detailed requirements for the securement of the following commodities:***

- Logs
- Dressed lumber
- Metal coils
- Paper rolls
- Concrete
- Pipe
- Intermodal containers
- Automobiles
- Light trucks
- Vans and heavy equipment and machinery
- Flattened or crushed vehicles;
- Roll-on/roll-off containers
- Large boulders.



# Cargo Securement Systems

***A securement system is a method that uses one or more of the following components:***

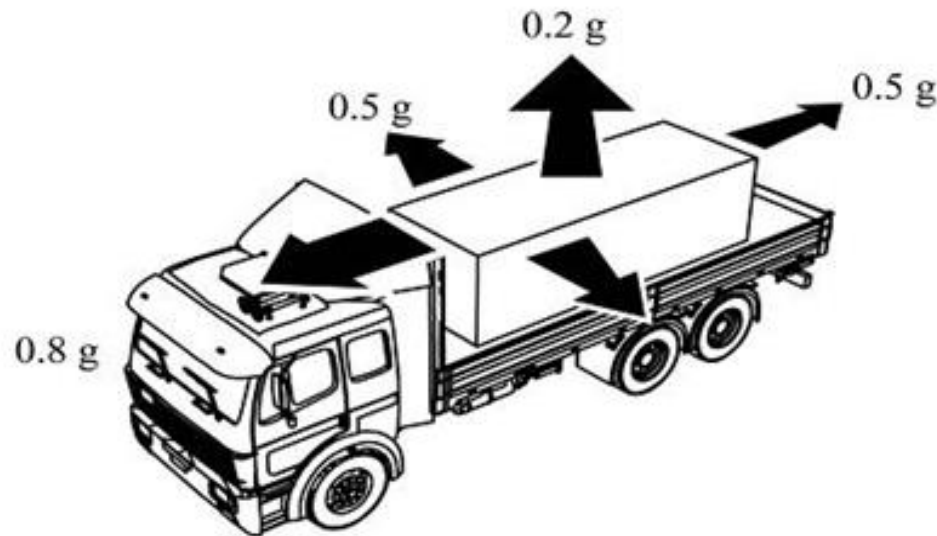
- ***Vehicle Structure***
  - *Floors, walls, decks, tiedown anchor points, headboards, bulkheads, posts, etc.*
  - *All elements must be in good working order; no damage, distress, or weakened parts/ sections*
- ***Securing Devices***
  - *Any device specifically manufactured to attach or secure cargo*
  - *Chain, webbing, rope, clamps, grab hooks, binders, shackles, friction mat, etc.*
- ***Blocking and bracing equipment***
  - *Material used for blocking or bracing and as chocks and cradle points*
  - *This also applies to any material used for dunnage (all loose materials used to support and protect cargo)*



# Cargo Securement Systems - Force Requirements

***Each cargo securement system must be able to withstand a minimum amount of force in each direction.***

- ***Forward Force = 50% (US) and 80% (Canada) of cargo weight when braking while driving straight ahead***
- ***Rearward Force = 50% of cargo weight when accelerating, shifting gears while climbing a hill, or braking in reverse***
- ***Sideways Force = 50% of cargo weight when turning, changing lanes, or braking while turning***
- ***Upward Force = 20% of cargo weight when traveling over bumps in the road or cresting a hill***





# Cargo Securement Systems – Tiedown

***A combination of securing devices which forms an assembly that attaches articles of cargo to, or restrains articles of cargo on, a vehicle or trailer, and is attached to anchor point(s). Tiedowns may:***

- ***Attach to the cargo and provide direct resistance to restrain the cargo from movement.***
- ***Pass over or through the cargo. They create a downward force that increases the effect of friction between the cargo and the deck. This friction restrains the cargo.***
- ***Requirements:***
  - ***A tiedown must be designed, constructed, and maintained so that the driver can tighten it***
  - ***All components must be in good working order; no damage, distress, or weakened parts/ sections***
  - ***Each tiedown must be attached and secured so that it does not become loose or unfastened, open, or release during transit.***
  - ***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 crushing, cutting, and abrasion.***

# Cargo Securement Systems – Tiedown Continued

## *How many tiedowns are required?*

	Load Description	Minimum # of Tiedowns
<b>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 these requirements:</b>	♦ 1.52 m (5 ft) or shorter ♦ 500 kg (1,100 lb.) or lighter	1
	♦ 1.52 m (5 ft) or shorter ♦ Over 500 kg (1,100 lb.)	2
	More than 1.52 m (5 ft) but 3.02 m (10 ft) or less	2
	Longer than 3.02 m (10 ft)	2 + 1 tiedown for every additional 3.02 m (10 ft), or part thereof
<b>If cargo is prevented from forward movement</b>	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.

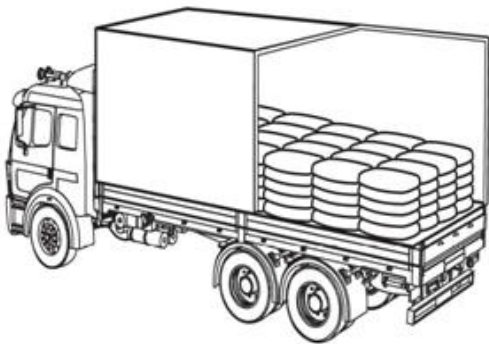
# Three Ways to Transport Cargo

Condition 1: Cargo is fully contained by structures of adequate strength. Cargo cannot shift or tip and cargo is restrained against horizontal movement by vehicle structure or by other cargo. Horizontal movement includes forward, rearward, and side to side.

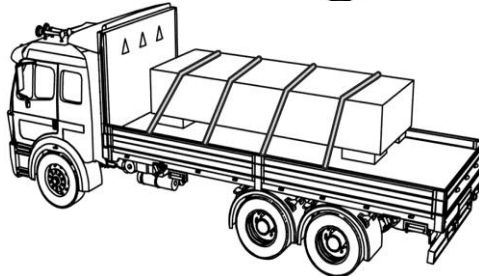
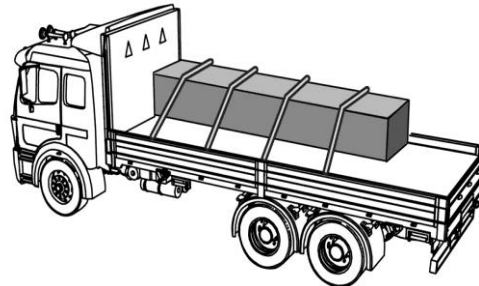
Condition 2: Cargo is immobilized by structures of adequate strength or a combination of structure, blocking, and bracing to prevent shifting or tipping.

**Condition 3: To prevent shifting or tipping, cargo is immobilized or secured on or within a vehicle by tiedowns along with blocking, friction mats, other cargo, etc.**

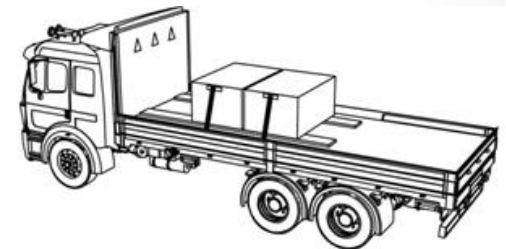
Condition 1



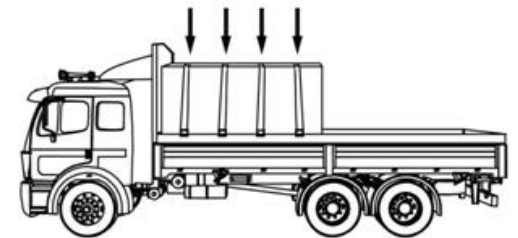
Condition 2



Condition 3



Secured on a vehicle



# Working Load Limit (WLL)

***The maximum load that may be applied to a component of a cargo securement system during normal service, usually assigned by the manufacturer of the component.***

The WLL is usually assigned by the component manufacturer.

***The FMCSA has specific working load limit requirements for your tiedown system. You must know the working load limit for all the components of your tiedown system. The specific requirements for various components can be found on the website: <http://fmcsa.dot.gov>***



# Inspection Requirements

Driver action required	Pre-Trip	Within first 80 km (50 mi)	When duty status of driver changes	At 3 hour intervals or every 240 km (150 mi), whichever is first
Inspect Cargo and Securing devices	✓	✓	✓	✓
Inform Carrier if Packaging is Not Adequate	✓			
Adjust Cargo and/or Securing devices	As necessary	As necessary	As necessary	As necessary
Add Additional Securing devices	As necessary	As necessary	As necessary	As necessary

***Cargo inspections should be performed as part of your pre-trip inspections. Make a log notation every time an inspection is performed***



# Inspections

## ***Pre-Trip Inspections***

- ✓ ***Make sure that cargo is properly distributed and adequately secured***
- ✓ ***Make sure that all securement equipment and vehicle structures are in good working order and used consistent with their capability.***
- ✓ ***Stow vehicle equipment.***
- ✓ ***Make sure that nothing obscures front and side views or interferes with the ability to drive the vehicle or respond in an emergency.***
- ✓ ***Inform carrier if packaging is not adequate. For example:***
  - Banding is loose or not symmetrical on package.
  - Banding attachment device(s) are inefficient.
  - Wrapping is broken or ineffective.
  - Pallet are broken.

## ***Periodic inspections during transit***

- ✓ ***Inspect cargo and securing devices.***
- ✓ ***Adjust cargo or load securement devices as necessary to ensure that cargo cannot shift on or within, or fall from, the commercial motor vehicle.***
- ✓ ***As necessary, add more securing devices.***

# Quiz

- 1) *True or False?* An improperly secured load can result in loss of life, damage of cargo, issuance of citations and fines.
- 2) *A securement system uses one or more of the following components*
  - A. *The vehicle structure*
  - B. *Securing devices*
  - C. *Blocking or bracing equipment*
  - D. *None of the above*
  - E. *All of the above*
- 3) *True or False?* The FMCSA does not have any regulations around the upward force of a load.
- 4) *A tiedown is a combination of securing devices which forms an assembly that attaches articles to a vehicle or a trailer. The tiedown system requires which of the following:*
  - A. *All components must be in working order*
  - B. *Must not come loose or unfastened*
  - C. *Must be designed so that the driver can tighten it*
  - D. *All of the above*

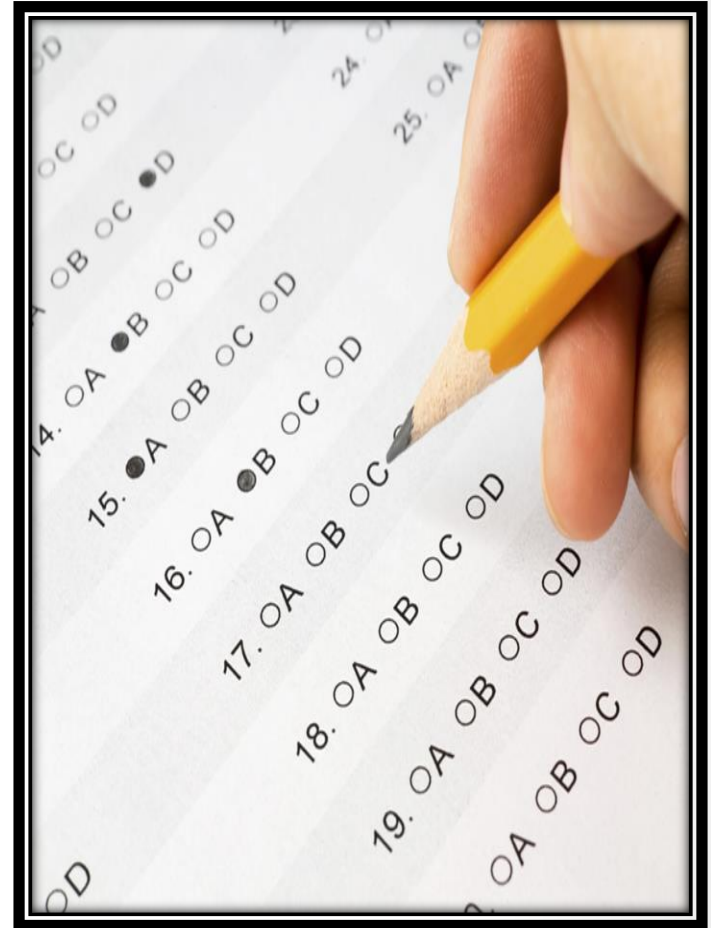
# Quiz

5. **True or False?** *There are 5 ways to transport cargo.*
6. **True or False?** *The Working Load Limit (WLL) is the maximum load that may be applied to a component of a cargo securement system during normal service, usually assigned by the manufacturer of the component.*
7. **True or False?** *You as the driver are required to know the working load limit for all the components of your tiedown system.*
8. **When should your cargo be inspected?**
  - A. **Never**
  - B. **During a pre-trip inspection**
  - C. **Periodically during transit**
  - D. **Every 50 miles**
  - E. **B & C**
  - F. **None of the above**



# Quiz Answers

1. *True*
2. *E*
3. *False*
4. *D*
5. *False*
6. *True*
7. *True*
8. *E*



# Question or Comments?



# Additional Information on Rules and Regulations

*This document is intended to be a guide on applicable rules and regulations. Although it may be used as a guide/reference for your training needs, this document is not intended to be used as the standard for FMCSA rules and regulations.*

***Additional information can be found on the FMCSA website.***

*The FMCSA website will contain the most accurate and up-to-date information on any and all applicable rules and regulations.*

<http://www.fmcsa.dot.gov>

