

Module 9: Cargo Securement



MODULE CONTENTS



Module 9 aims to provide carriers with information about proper Cargo Securement. The contents of this module are as follows.

Cargo Securement Standards	3
Securement Devices	4
General Securement	8
Commodity Specific Securement	12
Resources for Carriers	16

This is a guide only and is not meant to be a substitute for the actual legislation.

CARGO SECUREMENT STANDARDS



National Safety Code Standard 10



National Safety Code Standard 10 gives the guidelines for safely securing loads to commercial vehicles. For the purposes of cargo securement requirements, this standard was created to ensure the safety of drivers, employees, and the motoring public. Carriers must ensure that any cargo they carry does not shift, move or spill onto the roadway.

The cargo securement standards were created to:

- Reduce the number of accidents caused by cargo shifting or falling from commercial vehicles; and
- Harmonize the U.S., Canadian, and Mexican cargo securement regulations.

Cargo Securement in Alberta



Cargo securement standards in Alberta apply to all types of cargo carried in or on a commercial vehicle. A commercial vehicle is a vehicle or combination of vehicles that are registered for or weigh more than 4,500 kilograms (excluding buses).

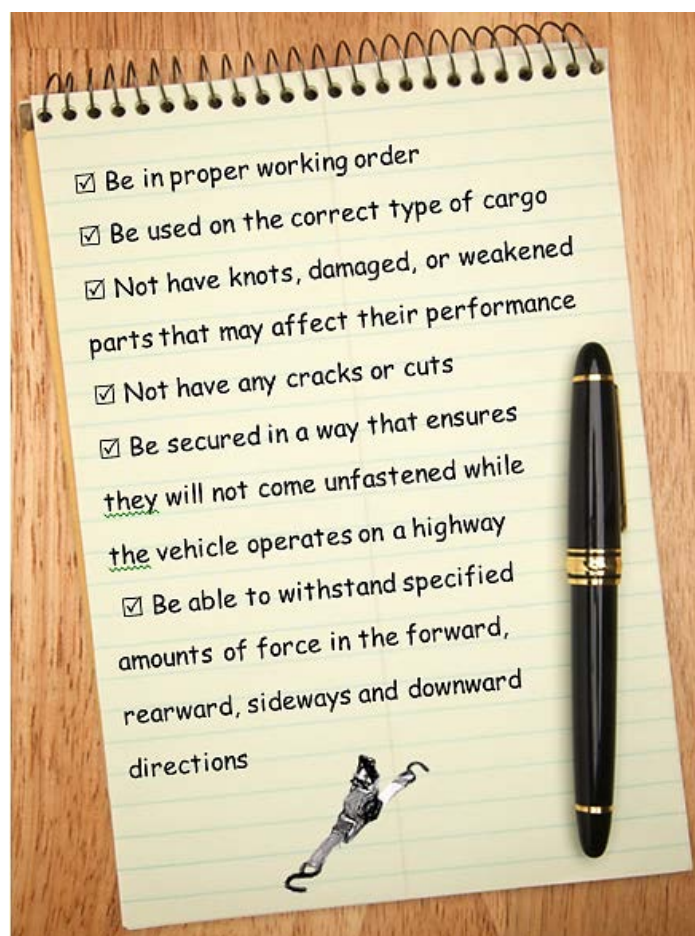
Section 17(3) of the *Commercial Vehicle Safety Regulation* (AR 121/2009) states that all cargo must be properly secured by a carrier according to the requirements found in NSC Standard 10. Section 17(4)(a) of the *Commercial Vehicle Safety Regulation* (AR121/2009) states cargo must not leak, spill, blow from, fall from, fall through or otherwise be dislodged from a commercial vehicle.



According to Section 41 of the *Commercial Vehicle Certificate and Insurance Regulation* (AR314/2002), carriers must ensure all drivers are trained in how to properly secure cargo.

SECUREMENT DEVICES

According to Division 2 of NSC Standard 10, all vehicle structures, systems and parts used to secure cargo must:



Proper Use of Tie Downs [CLICK HERE](#)



Each tie down must be secured so that it does not come loose, unfastened, opened or released while the vehicle is moving. This means that the driver of a vehicle must be able to securely tighten a tie down before transporting their cargo on a highway.



All tie downs and other parts of a cargo securement system must be located inside any rub rails whenever practical. Edge protection must also be used whenever a tie down would be subject to wear or cutting at the point where it touches an article of cargo. The edge protection must resist wear, cutting and crushing.

Information about the minimum number of tie downs that must be used to properly secure cargo may be found later in this module.

NOTE

According to the Canadian Council of Motor Transport Administrators (CCMTA), bungee cords and tarp straps **are not** suitable for use as tie downs, and are equally unsuited to having an assigned Working Load Limit (WLL). They may still be used, however, as supplementary restraint for light weight cargo and equipment.



Use of Unmarked Tie Downs



Current standards forbid the use of unmarked tie downs. Tie downs must be marked by the manufacturer with respect to their Working Load Limit (WLL). This ensures that all drivers use the proper equipment for securing a load.



Tie downs and other securement devices must be strong enough to properly secure a load. Manufacturers test these devices to determine how much force can be applied to them before they will break. The “working load limit” of a securement device refers to the maximum load that may be applied to that device during normal service.

Unrated and Unmarked Anchor Points



Current standards do not require the rating and marking of anchor points. Manufacturers are, however, encouraged to rate and mark anchor points which are used to resist any upward forces acting on cargo.



Front End Structures on Commercial Vehicles



A “front-end” structure, according to NSC Standard 10, is a vertical barrier that is placed across the front of a deck that prevents cargo from moving forward. Front end structures must meet the following requirements:

Height and Width

The height of the front end structure of a vehicle cannot be shorter than:

- a. The height at which it prevents cargo from moving forward; and
- b. 122 centimetres above the deck.

The width of the front end structure of a vehicle cannot be narrower than:

- a. The width of the vehicle; and
- b. The width at which it prevents cargo from moving forward.

Strength

The front end structure of a vehicle must be able to withstand a horizontal forward static load equal to 50% of the total weight of the cargo where:

- a. The height of the front end structure is shorter than 1.83 metres; and
- b. The cargo is uniformly distributed over all of the front end structure.

The front end structure of a vehicle must be able to withstand a horizontal forward static load equal to 40% of the total weight of the cargo where:

- a. The height of the front end structure is 1.83 metres or higher; and
- b. The cargo is uniformly distributed over all of the front end structure.

Penetration Resistance

The front end structure of a vehicle must be able to resist penetration by an article of cargo that contacts it when the vehicle decelerates at a rate of 6.1 metres per second per second.



Manufacturing Standards



There are minimum performance standards for each type of cargo securement equipment used. For further information about manufacturing standards, carriers may contact the associations listed below.

	SECTION	ASSOCIATION	WEB RESOURCE
1	Vehicle Structure	Truck Trailer Manufacturers Association	http://ttmanet.org/publications
2	Anchor Points	Truck Trailer Manufacturers Association	http://ttmanet.org/publications
3	Platform Bodies (Flatdecks)	Truck Trailer Manufacturers Association	http://ttmanet.org/publications
4	Van, Sided and Dump Bodies	Truck Trailer Manufacturers Association or Web Sling and Tie Down Association	http://ttmanet.org/publications or www.wstda.com/products
5	Tie Downs	Web Sling and Tie Down Association	www.wstda.com/products
6	Webbing Assemblies	Web Sling and Tie Down Association	www.wstda.com/products
7	Chain Assemblies	National Association of Chain Manufacturers	http://www.nacm.info/
8	Wire Rope and Attachments	Wire Rope Technical Board	www.wireropetechnicalboard.org/
9	Synthetic Rope and Attachments	Cordage Institute	www.ropecord.com/cart/cartpubs.asp
10	Steel Strapping	American Society for Testing and Materials	www.astm.org/Standards/D3953.htm
11	Clamps and Latches	International Standards Organization	www.iso.org/iso/home/standards.htm
12	Roll-on / Roll-off Containers	American National Standards Institute	http://webstore.ansi.org/

GENERAL SECUREMENT

Cargo Placement and Restraint



There are 3 ways cargo may be transported. A carrier must use one of these methods for general cargo securement.



Fully Contained Cargo

- Cargo must be contained in a vehicle of adequate strength;
- Cargo is restrained against horizontal movement by the vehicle structure, other cargo, or by other devices such as tie downs or webbing;
- Cargo cannot shift, tip, leak, spill, blow off, fall from, fall through or otherwise be dislodged from the vehicle.



Immobilized Cargo

- Cargo must be secured by proper tie downs, blocking or bracing;
- Cargo cannot shift, tip, leak, spill, blow off, fall from, fall through or otherwise be dislodged from the vehicle.



General Securement

- All cargo must be secured on or in a vehicle with tie downs along with:
- Blocking, bracing, friction mats, other cargo, or a combination of these things;
- Cargo cannot shift, tip, leak, spill, blow off, fall from, fall through or otherwise be dislodged from the vehicle.

Articles of cargo that are likely to shift, tip or roll must be restrained by chocks, wedges, or a cradle to prevent movement. These restraints must stay fastened or secured while the vehicle is moving.

The proper securement of cargo is important not only for the protection of the cargo itself, but also for ensuring the safety of a driver and the motoring public. Cargo that shifts or tips may cause a vehicle to tip or operate in an unsafe manner.

Working Load Limits (WLL)



Tie downs and other securement devices must be strong enough to properly secure a load. Manufacturers test these devices to determine how much force can be applied to them before they will break. The “working load limit” of a securement device refers to the maximum load that may be applied to that device during normal service. The aggregate (combined) working load limit is the sum of the working load limits of all devices that are used to secure an article on a vehicle.

To calculate aggregate (combined) working load limits:



For tie downs that go from one anchor point to another on the vehicle, add the WLLs of each tie down to get the aggregate WLL of the load.



For tie downs that go from one anchor point on the vehicle to an attachment point on the cargo itself, add together:

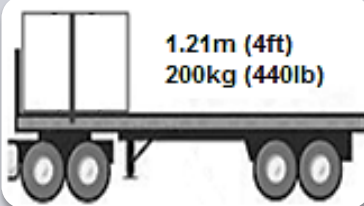
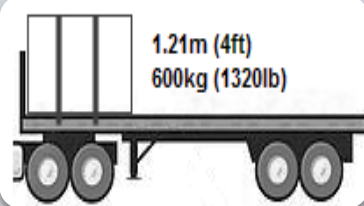

- 50% of the WLL of each end section of a tie down that is attached to an anchor point; plus
- 50% of the WLL of each end section that is attached to the cargo

The total working load limit of any cargo securement system must be at least half of the weight of the load being secured.

Minimum Number of Tie Downs



A carrier may need a certain number of tie downs to keep their cargo secure. When a piece of cargo is not blocked or positioned to prevent movement in the forward direction, the number of tie downs needed depends on the length and weight of that cargo.

 <p>1.21m (4ft) 200kg (440lb)</p>	 <p>1.21m (4ft) 600kg (1320lb)</p>	 <p>3.65m (12ft) 600kg (1320lb)</p>
<p>1 Tie Down</p> <ul style="list-style-type: none"> - For cargo 1.52 metres or shorter and 500 kilograms or less in weight 	<p>2 Tie Downs</p> <ul style="list-style-type: none"> - For cargo 1.52 metres or shorter and more than 500 kilograms - For cargo greater than 1.52m in length but less than 3.04m, regardless of weight 	<p>3+ Tie Downs</p> <ul style="list-style-type: none"> - For cargo longer than 3.04m

When a piece of cargo is not blocked or positioned to prevent forward movement and the item is longer than 3.04 metres (10 feet) in length, then it must be secured by:

- Two tie downs for the first 3.04 metres of length; plus
- One extra tie down for every 3.04 metres of length, or fraction of, beyond the first 3.04 metres.

If cargo is blocked or braced to prevent forward movement by a header-board, bulkhead, or by other means, then it must be secured by at least:

- one tie down for the first 3.04 metres of length; plus
- One extra tie down for every 3.04 metres of length, or fraction of, beyond the first 3.04 metres (if cargo is longer than 3.04m).

Commodity-Specific Requirements



Some types of cargo are difficult to secure with regular tie downs or other general methods. To assist with these types of cargo, there is a set of commodity-specific requirements. These requirements apply in addition to and not instead of the general requirements:

Applicability

27(1) This Part applies in addition to and not instead of Part 1.

(2) Where a requirement for containing, immobilizing or securing cargo transported by a vehicle required under this Part differs from a requirement under Part 1, the provisions of this Part apply.

Commodity-specific securement requirements are available for:

- Logs;
- Dressed lumber;
- Metal coils;
- Paper rolls;
- Concrete pipe;
- Intermodal containers;
- Vehicles (small, large, crushed);
- Crushed vehicles;
- Roll-on/roll-off or hook lift containers;
- Large boulders.



For the complete requirements for these specific commodities, see NSC Standard 10. A carrier must secure each of these commodities according to the rules found in the standard.

COMMODITY SPECIFIC SECUREMENT



LOGS

There are many rules for the transportation of logs. A carrier must not only have a vehicle that was built specifically for hauling logs, but must also secure those logs according to the requirements in [Division 1, NSC Standard 10](#).

The rules for the transportation of logs apply to the transportation of almost all logs except:

- Loads of no more than four logs;
- Firewood, stumps, log debris or logs that are transported in a vehicle or container that is enclosed on all sides and strong enough to contain them.

In these special cases, logs may be transported using the general cargo securement rules.



DRESSED LUMBER

Dressed lumber is lumber that has been surfaced or planed smooth on four sides. Special rules for the securement of dressed lumber apply to:

- Bundles of dressed lumber and packaged lumber;
- Building products including plywood, gypsum board or other materials of similar shape.

These items must be secured according to the requirements in [Division 2, NSC Standard 10](#). Lumber or building products that are not bundled or packaged must be treated as loose items and transported using the general cargo securement rules.



METAL COILS

Special rules for the transportation of metal coils apply to a vehicle that is transporting one or more metal coils that, individually or grouped together, have a total weight of 2,268 kilograms or more. These coils must be secured according to the requirements in [Division 3, NSC Standard 10](#).

Shipments of metal coils that weigh less than 2,268 kilograms may be secured using the general cargo securement rules.



PAPER ROLLS

Special rules for the transportation of paper rolls apply to a vehicle that is transporting one or more paper rolls that, individually or grouped together, have a total weight of 2,268 kilograms or more. These rolls must be secured according to the requirements in [Division 4, NSC Standard 10](#).

Shipments of paper rolls that weigh less than 2,268 kilograms may be secured using the general cargo securement rules.



CONCRETE PIPE

Special rules may apply to vehicles, flatbed trailers and lowboy trailers that are transporting concrete pipe. The pipe being transported must be secured according to the requirements in [Division 5, NSC Standard 10](#).

Concrete pipe that is bundled tightly together into a single rigid piece with no tendency to roll and concrete pipe loaded into a sided container must be secured using the general cargo securement rules.



INTERMODAL CONTAINERS

Intermodal containers are freight containers that are designed to be transported in more than one way (for example, by road, rail or sea). These containers must either be transported on a chassis vehicle or must be secured on a different vehicle according to the requirements in [Division 6, NSC Standard 10](#).

Cargo that is inside an intermodal container may be secured using the general cargo securement rules unless another commodity specific rule applies.



VEHICLES AS CARGO

Special rules apply to the transportation of light vehicles, heavy vehicles and flattened or crushed light vehicles. These vehicles must be secured according to the requirements in [Division 7, NSC Standard 10](#).

“Light” vehicles are vehicles that weigh 4,500 kilograms or less. “Heavy” vehicles are vehicles that weigh more than 4,500 kilograms.



ROLL-ON/ROLL-OFF AND HOOK LIFT CONTAINERS

Special rules apply to the transportation of roll-on/roll-off containers and hook lift containers. Hook lift containers are primarily used to transport materials in the waste, recycling, construction, demolition and scrap industries. These containers are handled by specialized vehicles in which the container is loaded and unloaded onto a tilt frame body by a moveable hook arm.

These containers must be secured according to the requirements in [Division 8, NSC Standard 10](#).



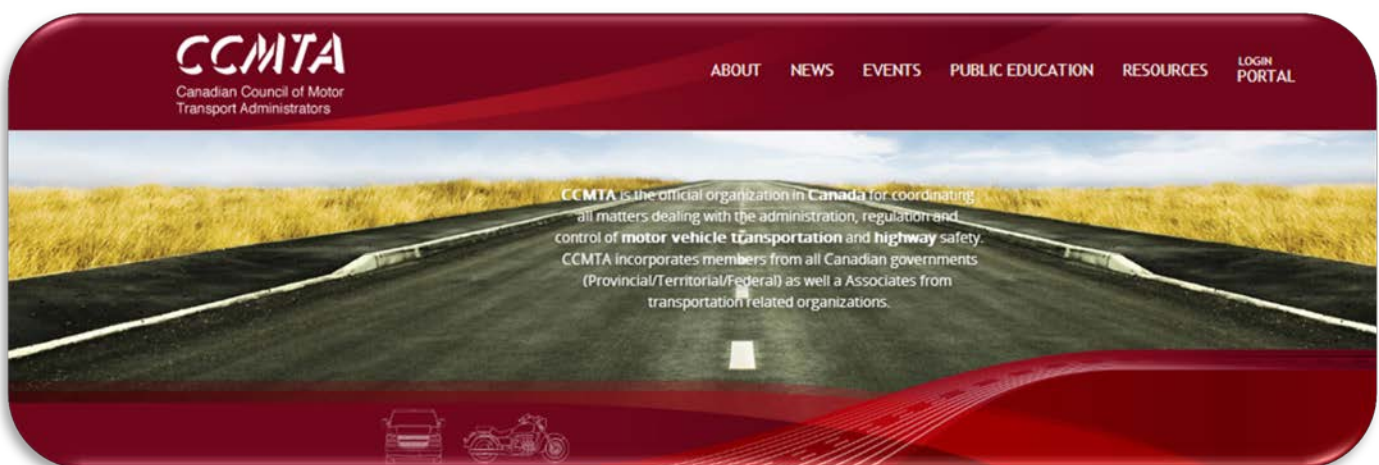
BOULDERS

Special rules apply to the transportation of:

- Boulders on a flatbed vehicle;
- Boulders in a vehicle that is not designed to contain them;
- A piece of natural, irregularly shaped rock that weighs more than 100 kilograms but less than 5,000 kilograms;
- A piece of natural, irregularly shaped rock of any size that may be contained within a vehicle that is designed to carry it;
- A piece of rock of any size that is artificially formed or cut into shape and has a stable base for securement.

These boulders must be transported according to the requirements in [Division 9, NSC Standard 10](#). Some exemptions may apply to boulders that may be secured using the general securement rules.

For the complete requirements for these specific commodities, see NSC Standard 10. A carrier must secure each of these commodities according to the rules found in the standard.



RESOURCES FOR CARRIERS

The following web links may be helpful in assisting a carrier in meeting all required Cargo Securement standards relevant to their operations.

Resource	Web Link
The Alberta <i>Commercial Vehicle Safety Regulation</i> (AR121/2009)	www.qp.gov.ab.ca
National Safety Code Standard 10	www.ccmta.ca
NSC Standard 10 Interpretations	www.ccmta.ca/images/pdf-documents-english/cargo_securement/Interpretations and Guidance 2016.pdf
The Alberta Motor Transport Association	www.amta.ca

