Blocking and Bracing

All cargo must be secured from forward (longitudinal) and sideways (lateral) movement.

When a motor vehicle carries cargo that is not firmly braced against a front-end structure, or cargo that may shift sideways in transit, the cargo must either be securely blocked or braced against the sides, sideboards, or stakes of the vehicle or be secured by other means to prevent any forward and/or sideways movement.

Requirements for front end structures used as part of a cargo securement system?

Commercial motor vehicles transporting articles of cargo that are in contact with the front end structure of the vehicle must meet the following:

Height and width

- The front end structure must extend either to a height of 4 feet above the floor of the vehicle or to a height at which it blocks forward movement of any item or article of cargo being carried on the vehicle, whichever is lower.

- The front end structure must have a width which is at least equal to the width of the vehicle or which blocks forward movement of any article of cargo being transported on the vehicle, whichever is narrower.

Penetration resistance.

- The front end structure must have no aperture large enough to permit any article of cargo in contact with the structure to pass through it.

Substitute devices.

The requirements may be met by the use of devices performing the same functions as a front end structure, if the devices are at least as strong as, and provide protection against shifting articles of cargo at least equal to, a front end structure which conforms to those requirements.

Projecting Loads

The load upon any vehicle shall not extend more then 3 feet beyond the front wheels or front bumper of the vehicle.
Any vehicle having a load or component which extends beyond the sides more than 4 inches or more than 4 feet beyond the rear shall have the extremities of the load marked with a red flag, not less than 18 inches square and lights when required.

Firewood Loads

No person shall transport firewood in a vehicle in an unsafe manner. No vehicle that has a cargo area without a rear wall may be driven with a load of cut firewood of less than three feet in length unless the rear cargo area is covered to prevent any part of the load from escaping from the rear.

Manner of Loading

No vehicle is to be driven or moved on the highway unless it is so constructed, loaded or the load securely covered as to prevent any of its load from dropping, sifting, leaking, blowing or otherwise escaping.

This does not apply to vehicles operated by a farmer when transporting produce such as small grains, shelled corn, soybeans, or other farm produce of a size and density not likely to cause injury to persons or damage to property on escaping in small amounts.

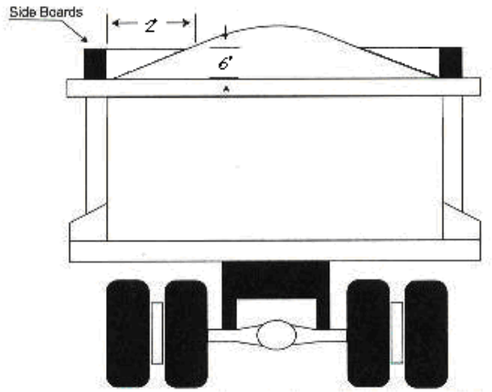
Vehicles transporting garbage, rubbish, trash, debris, or similar materials are not required to cover the materials if:

1. the vehicle is operated at 30 MPH or less
2. the vehicle is not operated on any interstate highway and
3. no part of the load escapes from the vehicle. If it does, the driver must immediately retrieve the material.

Covered Loads

When transporting sand, gravel, aggregate, dirt, lime rock, silica or similar materials the cargo carrying compartment of the vehicle must be securely covered if:

1. the vertical distance from the top of the cargo box to the top of the load is less than six inches, or
2. the horizontal distance from the top of the cargo box to the load is less than two feet.



The driver is also required to clean the vehicle of loose sand, gravel, aggregate, dirt, lime rock, silica, or similar material before moving the vehicle following loading or unloading.

Commodity Specific Load Securement Requirements

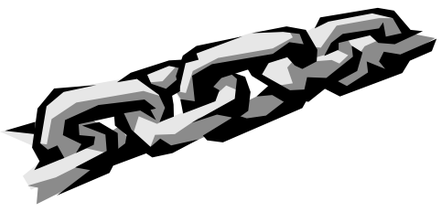
There are commodity specific requirements for logs, lumber, metal coils, paper rolls, concrete pipe, intermodal containers, passenger vehicles, heavy equipment, crushed vehicles, roll off containers, and large boulder in the Federal Motor Carrier Safety Regulations. You should refer to those regulations for additional requirements.

More information regarding load securement may be found in the Federal Motor Carrier Safety Regulations and Minnesota Traffic Regulations

Minnesota State Patrol
Commercial Vehicle Section
1110 Centre Point Curve, Suite 410
Mendota Heights, MN 55120
1-651-405-6171
msp.dps.mn.gov

05/12 40-5055

Load Securement



Requirements for Safe Loading of Vehicles

As the driver of a vehicle which transports any type of cargo, you should be aware of the proper procedures for securing that cargo. This pamphlet is designed to inform you of the various laws regarding load securement.

Safe Loading

No person is allowed to drive a commercial motor vehicle unless the vehicle's cargo is properly distributed and adequately secured. The vehicle's tailgate, tailboard, doors, tarps, spare tire and other equipment and the means of fastening the vehicle's cargo must be secured.

The driver of a truck or truck tractor is required to examine and make any adjustments as necessary to the vehicle's cargo and its load-securing devices within the first 50 miles after beginning a trip. Periodic examination of the cargo and load-securing devices should also be made every 3 hours or 150 miles, whichever occurs first. (unless the trailer is sealed and the driver is ordered not to open to inspect the cargo)

Basic Requirements

Which types of commercial motor vehicles are subject to the cargo securement standards and what general requirements apply?

The basic requirements are applicable to trucks, truck tractors, semitrailers, full trailers, and pole trailers. 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.

Cargo Securement Devices

Tiedown assemblies may consist of chains, cables, steel straps, fiber webbing, and other securement devices and attachment of fastening devices. All tiedowns, cargo securement systems, parts and components used to secure cargo must be in proper working order when used to perform that function with no damaged 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.

General Requirements for Securing Articles of Cargo

Cargo must be firmly immobilized or secured on or within a vehicle by structures of adequate strength, dunnage or dunnage bags, shoring bars, tiedowns or a combination of these.

The aggregate working load limit of tiedowns used to secure an article or group of articles against movement must be at least one-half times the weight of the article or group of articles. 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 anchor point on an article of cargo;
- **One-half the working load limit** of each tiedown that is attached to an anchor point on the vehicle, passes through, over, or around the article of cargo, and is then attached to an anchor point on the **same side** of the vehicle.
- **The working load limit** for each tiedown that goes from an anchor point on the vehicle, through, over, or around the article of cargo, and then attaches to another anchor point on the other side of the vehicle.

Determining the Working Load Limit of a Securement Device

The working load limit (WLL) of a tiedown, associated connector or attachment mechanism is the lowest working load limit of any of its components (including tensioner), or the working load limit of the anchor points to which it is attached, whichever is less.

The working load limits of tiedowns may be determined by using either the tiedown manufacturer's markings or by using the following tables. The working load limits listed in the tables are to be used when the tiedown material is not marked by the manufacturer with the working load limit. Tiedown materials which are marked by the manufacturer with working load limits that differ from the tables, shall be considered to have a working load limit equal to the value for which they are marked.

Welded steel chain which is not marked or labeled to enable identification of its grade or working load limit shall be considered to have a working load limit equal to that for grade 30 proof coil chain.

Working Load Limits (WLL) Table

Chain WLL (in pounds)

Size inch(mm)	Grade 3 poof coil	Grad 4 high test	Grade 7 transport	Grade 8 alloy
1/4 (7)	1300	2600	3150	3500
5/16 (8)	1900	3900	4700	4500
3/8 (10)	2650	5400	6600	7100
7/16 (11)	3700	7200	8750	……..
1/2 (13)	4500	9200	11300	12000
5/8 (16)	6900	13000	15800	18100
Chain mark	PC	HT	………..	T
Examples	3	4	7	8
	30	40	70	80

Synthetic Webbing WLL

Width inch (mm)	WLL pounds
1-3/4 (45)	1750
2 (50)	2000
3 (75)	3000
4 (100)	4000

What else do I have to do to determine the minimum number of tiedowns?

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.

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

- One tiedown for articles 5 feet or less in length, and 1,100 pounds or less in weight;
- Two tiedowns if the article is:
  - 5 feet or less in length and more than 1,100 pounds in weight; or
  - Longer than 5 feet but less than or equal to 10 feet in length, irrespective of the weight.
  - Two tiedowns if the article is longer than 10 feet, and one additional tiedown for every 10 feet of article length, or fraction thereof, beyond the first 10 feet of length.
- If an individual article is blocked, braced, or immobilized to prevent movement in the forward direction by a headerboard, 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 10 feet of article length, or fraction thereof.

As an example, the article below would require enough tiedown assemblies to provide an aggregate WLL equal to or greater than 50,000 lbs (1/2 the weight of the article.) Generally, these tiedown assemblies should be located so they provide 50,000 lbs of WLL strength in each longitudinal (foreward and rearward) and 25,000 lbs WLL strength in each lateral (side to side) direction.