



MICHIGAN CENTER
for TRUCK SAFETY

Cargo Securement

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Why is cargo securement so important?

- Vehicle accidents
- Loss of life
- Loss/damage of load
- Damage to vehicles and property
- Fines and citations



Your accident is a Lawyers meal ticket. BE SAFE!

Basic Requirements

The basic requirements of cargo securement apply to trucks, truck tractor, semitrailers, full trailers and pole trailer.

Every CMV must be loaded/equipped and the cargo secured to prevent spillage of any sort.

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

Safe Loading Act 300 Sec. 257.720

No person may operate a commercial motor vehicle unless the vehicle's cargo is properly distributed and adequately secured which includes:

- Tailgate
- Tailboard
- Doors
- Tarps
- Spare tire and any other equipment used in operation of the vehicle



Tarping of loads

CMV's carrying a load of loose material such as:

- Sand
- Gravel
- Stone or
- Waste material

Must be tarped! For those loads that will not blow off sift off and have their centers of gravity at least 6" below the enclosure is not required to be tarped



Inspection of Cargo by Driver

The operator of a truck or truck tractor is required to examine and make adjustments as necessary to the cargo and its securement devices within the first 50 miles after beginning a trip.

Periodic examination 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 it to inspect the cargo).

Blocking and Bracing

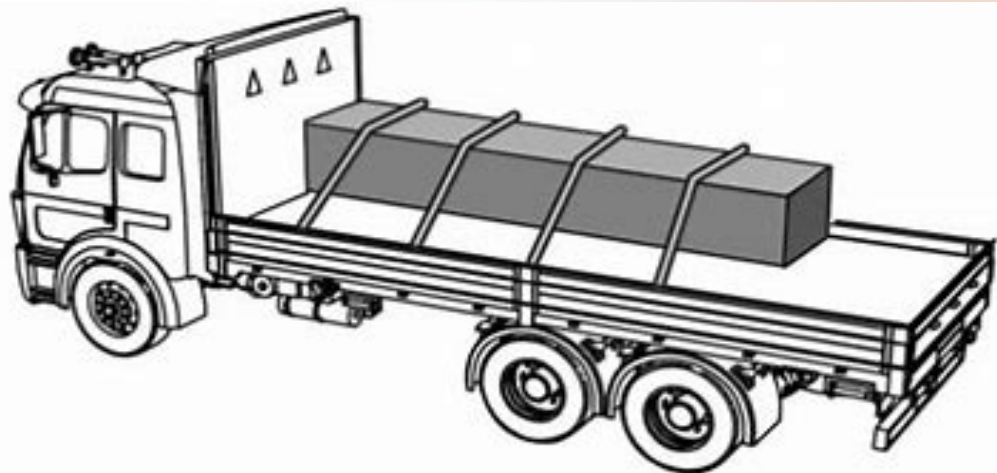
Cargo must be secured from forward, rearward and from side to side movement at all times.

When cargo is not firmly braced against a frontend structure or if cargo may shift in any direction while in transit, the cargo must be securely blocked against the sides, sideboards, or stakes of the vehicle or secured by other means to prevent movement in any direction.



Requirements for Front-end Structures

Commercial motor vehicles transporting cargo that uses the front-end structure as part of the cargo-securing system requires placing the cargo in contact with the structure. The front-end structure must meet certain size and strength requirements.



The Front-end Structure must:

- Be at least 4ft above the vehicle floor for cargo that is 4ft and higher
- Be high enough to block forward cargo movement for cargo that is lower than 4ft high
- Be as wide as the vehicle or at least as wide as the cargo
- The front-end structure must have no holes or gaps large enough to permit any article of cargo which is in contact with the front-end structure to have the capability to pass through it.



393.110

Substitute device for specialized cargo

Projecting Loads

The load of any vehicle may not extend more than 3 feet beyond the front of the vehicle provided the length of the vehicle and load do not exceed the allowable vehicle length.

Any vehicle having a load which extends 4 inches or more beyond the sides or more than 4 feet beyond the rear shall have such overhang marked with a red/orange flag, not less than 18 inches square and lights when required.

Certain projecting loads may require a special permit.



Single vehicle length

A truck, with or without a load (excluding impact absorbing bumpers) shall not exceed 40 feet-on all routes.

Manner of Loading

(Motor Vehicle Code Act 300 Sec. 257.720)

A person shall not drive or allow a vehicle to be operated on a highway unless it is so secured as to prevent any of its load from:

- Dropping
- Sifting
- Leaking
- Blowing or otherwise escaping from the vehicle

Exception to loading

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



Commodity Specific Requirements

Federal Motor Carrier Safety Regulations (FMCSR) Part 393.100 thru 136.

There are commodity specific requirements for logs, lumber, metal coils, paper rolls, concrete pipe, intermodal containers, crushed vehicles, roll off containers, and large boulders.

Act 300 Sec. 257.720

- Actual spillage is not necessary to prove a violation.
- A vehicle carrying a load that is not completely enclosed shall:

Have the load covered

Have the load securely fastened to the body or frame with binders.

Elements of Securement System

One or a combination of the following elements must be met.

- Vehicle structure
- Securement devices
- Blocking and bracing

Vehicle Structure

Must be strong enough to withstand natural forces when in transit.
Must be in proper working order with no obvious damage or weakness if used as part of cargo securement system.

This includes:

- Floors
- Walls
- Decks
- Headboards
- * Bulkheads
- * Stakes
- * Posts
- * Anchor Points

Cargo Securement Devices

Tiedown assemblies may consist of chains, cables, steel straps, fiber webbing, etc. All tiedowns and cargo securement systems must be in proper working order when used to secure cargo with no damage or weakened components such as cracks or cuts that will adversely affect their performance



Tiedown markings

- Most tiedown components have the WLL stamped or tagged on them
- Some manufacturers mark tiedown assemblies, or components, with numeric WLL value
- If the marking can not be read, it will be treated at default value, meaning it will get the lowest rating of that particular tiedown



Tiedown requirements

Edge protection must be used if a tiedown could be cut or worn as it secures the cargo



Dunnage Securement

Make sure to take the time to secure any loose cargo or objects and clean off decks and tracks when needed!



Whenever practicable to protect tiedowns and other components the tiedowns should be within the rub rails for platform type vehicles. This is not a requirement it is a suggestion to protect tiedown from impact.

(Unless the load extends to or beyond the rub rails)



Bungee Cords are not a proper securement device for cargo!!!!

Blocking and Bracing

393.104

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



General Requirements cont.

The aggregate WLL of tiedowns must be at least one-half the weight of the article or group of articles and is the sum of:

½ the WLL of each tiedown that goes from an anchor point on the vehicle to an anchor point on an article of cargo.

½ the WLL 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 full WLL for each tiedown that goes from an anchor point on the vehicle, through, over, or around the article of cargo, and then attaches to an anchor point on the other side of the vehicle.



Determining the WLL of a Securement Device

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

The WLL of tiedowns may be determined by using the manufacturer's markings or the following tables:

These tables are to be used when the tiedown material has not been marked with a WLL by the manufacturer.

Chains

Size mm (inches)	WLL in kg (pounds)				
	Grade 30 proof coil	Grade 43 high test	Grade 70 transport	Grade 80 alloy	Grade 100 alloy
1. 7 (1/4)	580 (1,300)	1,180 (2,600)	1,430 (3,150)	1,570 (3,500)	1,950 (4,300)
2. 8 (5/16)	860 (1,900)	1,770 (3,900)	2,130 (4,700)	2,000 (4,500)	2,600 (5,700)
3. 10 (3/8)	1,200 (2,650)	2,450 (5,400)	2,990 (6,600)	3,200 (7,100)	4,000 (8,800)
4. 11 (7/16)	1,680 (3,700)	3,270 (7,200)	3,970 (8,750)		
5. 13 (1/2)	2,030 (4,500)	4,170 (9,200)	5,130 (11,300)	5,400 (12,000)	6,800 (15,000)
6. 16 (5/8)	3,130 (6,900)	5,910 (13,000)	7,170 (15,800)	8,200 (18,100)	10,300 (22,600)
Chain Mark Examples					
Example 1	3	4	7	8	10
Example 2	30	43	70	80	100
Example 3	300	430	700	800	1000

Synthetic Webbing

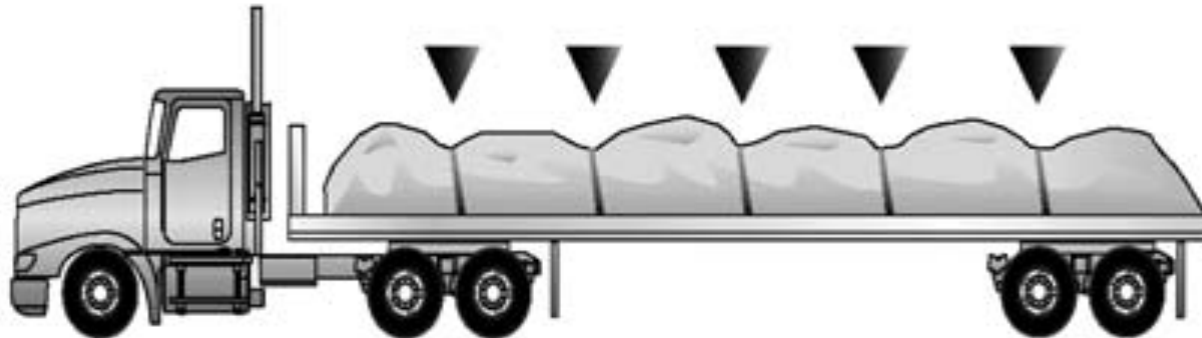
Width mm (inches)	WLL kg (pounds)
45 (1 3/4)	790 (1,750)
50 (2)	910 (2,000)
75 (3)	1,360 (3,000)
100 (4)	1,810 (4,000)

How many tiedowns are needed?

When an article is blocked or braced to prevent forward movement, it must be secured by at least one tiedown for every 10 feet of article length or fraction thereof.

TIE-DOWN DEVICES

Cargo should have at least one tie-down for each 10 feet of cargo.
Make sure you have enough tie-downs to meet this need. No matter how small the cargo is, there should be at least two tie-downs holding it.



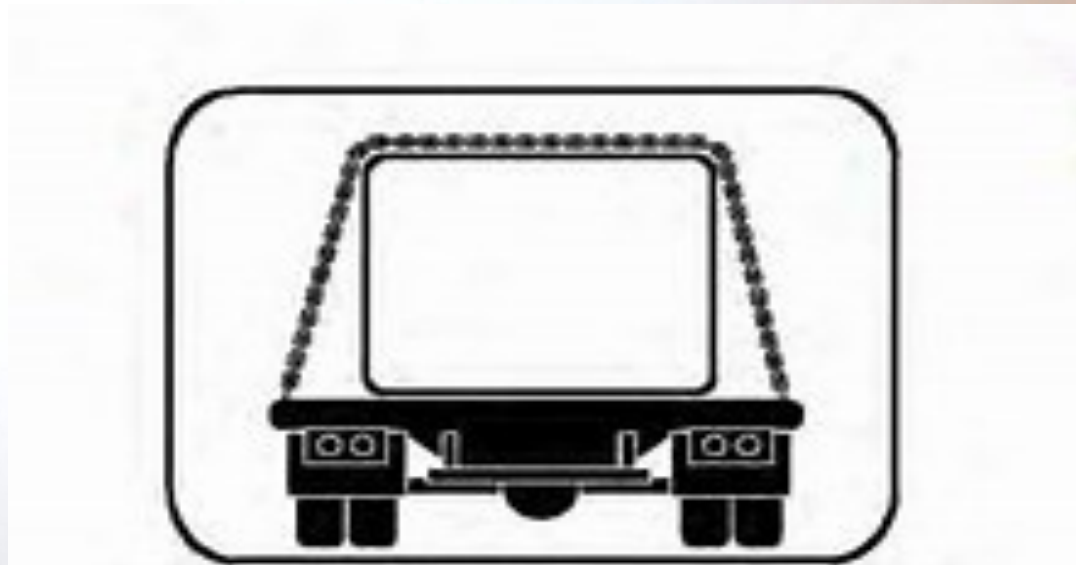
Direct Tiedown

A direct tiedown is when the tiedown is secured on one side of the trailer and then attaches to the load on the same side. The direct tiedown will only get half the working load of such tiedown.



Indirect Tiedown

An indirect tiedown is a tiedown that attaches to one side of the trailer and goes through around or over the load to attach to the other side. This tiedown will get the full WLL of that tiedown.



Articulated Vehicles

Any vehicle or piece of machinery that have parts that can move up and down or articulate must be restrained against movement in a manner that prevents articulation or movement while in transit.



Aggregate WLL

- Excavator 65,000 lbs
- 32,500 lbs = $\frac{1}{2}$ weight of excavator

Using $\frac{1}{2}$ inch Grade 70 Transport Chain which is = to 11,300 WLL per chain

How many tiedowns would be required?

Aggregate WLL

- 4 Direct tiedowns = 5,650 lbs each
- $4 \times 5,650 \text{ lbs} = 22,600 \text{ lbs}$ (which covers the four point rule)
- $32,500 \text{ lbs} - 22,600 = 9,900 \text{ lbs}$ left to cover

Aggregate WLL

- One indirect tiedown (which goes from one side of trailer to the other is = 11,300lbs
- Four direct tiedowns = 22,600 lbs
Equals 33,900 lbs

This is more than the required 32,500lbs correct?

Plus you will need one tiedown for any accessory or articulating part (up and down or side to side)

On Highway Inspection

- All loads including exceptions are subject to on-highway inspection
- Driver and /or carrier could be cited for a violation/laid with a charge
- **There are no exceptions!!!!!!**

Nursery transport and securement



Equipment & Trees Headed To Job Site

Nursery stock transport



Tarped Nursery Stock Transport



Traffic violations that will get you stopped!

- Speed
- Seatbelt
- Following too close
- Failing to stop at a stop sign
- Failure to use turn signals
- Talking or texting on a cell phone
- Equipment
- Erratic driving
- Fatigued or drunk driving

Emergency Equipment

All CMV's must carry the following

- Fire extinguisher 5 B:C rating or more
- Spare Fuses.
- Warning devices (triangles or flares) for stopped vehicles (regulations require this within **10 minutes of stopping**)

Conspicuity Markings or Reflective Tape

- Required on trailers 80" or wider and GVWR of 10,001 lbs or more.
- Truck tractors manufactured on or after 7/1/1997

Part 396 Periodic Inspection

- Every CMV operated in interstate commerce that is greater than 10,000 lbs is required to receive a periodic inspection every 12 months.
- Carriers may perform required annual inspections if qualified
- A copy of the inspection report or the inspection sticker must be on the vehicle.

Ways to stay in compliance

- Be organized!
Know where things are, keep truck well-maintained, keep documents and cab neat so the inspection goes forward smoothly
- Be respectful and courteous!
- Be prepared!
Always be ready for a DOT truck inspection at any time

BE SAFE!!!!

Not only for you and your family but for all families. You are the professional remember that when your driving!





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