



# CARGO SECUREMENT REGULATIONS FOR THE CONCRETE PIPE INDUSTRY



**F M C S A**  
Federal Motor Carrier Safety Administration



American  
**Concrete Pipe**  
Association

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The information presented is synthesized from the Regulatory Guidance for the Federal Motor Carrier Safety Regulation's Part 393—Parts and Accessories necessary for safe operations and Subpart I – Protection Against Shifting or Falling Cargo

The complete document can be found on the Federal Motor Carrier Safety Administration web site [www.fmcsa.dot.gov](http://www.fmcsa.dot.gov)

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The information provided is believed to be correct and every effort was exercised to insure accuracy. If you have any concerns regarding accuracy, it is recommended that the appropriate web site be reviewed.

**The Office of Federal Motor Carriers and Safety Administration Concrete Pipe Securement Regulations.  
The attached rule is effective December 26, 2002.  
Motor carriers must ensure compliance with the final rule by January 1, 2004**

Sec. 393.124 What are the rules for securing concrete pipe?

(a) Applicability.

- (1) The rules in this section apply to the transportation of concrete pipe on flatbed trailers and vehicles, and lowboy trailers,
- (2) Concrete pipe bundled tightly together into a single rigid article that has no tendency to roll, and concrete pipe loaded in a sided vehicle or container must be secured in accordance with the provisions of Secs. 393.100 through 393.120.

(b) General Specifications for tiedowns.

- (1) The aggregate working load limit of all tiedowns on any group of pipe must not be less than half the total weight of all pipe in the group.
- (2) A transverse tiedown through a pipe on an upper tier

or over longitudinal tiedowns is considered to secure all those pipes beneath on which the tiedowns cause pressure.

(c) Blocking.

- (1) Blocking may be one or more pieces placed symmetrically about the center of a pipe,
- (2) One piece must extend at least half the distance from the center to each end of the pipe, and two pieces must be placed on the opposite side, one at each end of the pipe.
- (3) Blocking must be placed firmly against the pipe, and must be secured to prevent it moving out from under the pipe,
- (4) Timber blocking must have minimum dimensions of at least 10 X 15 cm (4 x 6 in).

- (d) Arranging the load.
- (1) Pipe of different diameter. If pipe of more than one diameter are loaded on a vehicle, groups must be formed that consist of pipe of only one size, and each group must be separately secured.
  - (2) Arranging a bottom tier. The bottom tier must be arranged to cover the full length of the vehicle, or as a partial tier in one group or two groups.
  - (3) Arranging an upper tier. Pipe must be placed only in the wells formed by adjacent pipes in the tier beneath. A third or higher tier must not be started unless all wells in the tier beneath are fitted.
  - (4) Arranging the top tier. The top tier must be arranged as a complete tier, a partial tier in one group, or a partial tier in two groups.
  - (5) Arranging bell pipe.
    - (i) Bell pipe must be loaded on at least two longitudinal spacers of sufficient height to ensure that the bell is clear of the deck.
    - (ii) Bell pipe loaded in one tier must have the bells alternating on opposite sides of the vehicle.
    - (iii) The ends of consecutive pipe must be staggered, if possible, within the allowable width, otherwise they must be aligned.
    - (iv) Bell pipe loaded in more than one tier must have the bells of the bottom tier all on the same side of the vehicle.
    - (v) Pipe in every upper tier must be loaded with bells on the opposite side of the vehicle to the bells of the tier below.
    - (vi) If the second tier is not complete, pipe in the bottom tier which do not support a pipe above must have their bells alternating on opposite sides of the vehicle.
- (e) Securing, pipe with an inside diameter up to 1,143 mm (45 in). In addition to the requirements of paragraphs (b), (c), and (d) of this section, the following rules must be satisfied:

- (1) Stabilizing the bottom tier.
  - (i) The bottom tier must be immobilized longitudinally at each end by blocking, vehicle end structure, stakes, a locked pipe unloader, or other equivalent means.
  - (ii) Other pipe in the bottom tier may also be held in place by blocks and/or wedges; and
  - (iii) Every pipe in the bottom tier must also be held firmly in contact with the adjacent pipe by tiedowns through the front and rear pipes.
  - (iv) At least one tiedown through the front pipe of the bottom tier must run aft at an angle not more than 45 degrees with the horizontal, whenever practicable.
  - (v) At least one tiedown through the rear pipe of the bottom tier must run forward at an angle not more than 45 degrees with the horizontal, whenever practicable.
- (2) Use of tiedowns.

- (i) Each pipe may be secured individually with tiedown through the pipe.
- (ii) If each pipe is not secured individually with a tiedown, then:
  - (A) Either one 1/2-inch diameter chain or wire rope, or two 3/8-inch diameter chain wire ropes, must be placed longitudinally over the group of pipes;
  - (B) One transverse tiedown (direct or indirect) must be used for every 3.04 m (10 ft) of load length. The transverse tiedowns may be placed through a pipe, or over both longitudinal tiedowns between two pipes on the top tier.
  - (C) If the first pipe of a group in the top tier is not placed in the first well formed by pipes at the front of the tier beneath, it must be secured by an additional tiedown that runs rearward at an angle not more than 45 degrees to the

horizontal, whenever practicable. This tiedown must pass either through the front pipe of the upper tier, or outside it and over both longitudinal indirect tiedowns; and

- (D) If the last pipe of a group in the top tier is not placed in the last well formed by pipes at the rear of the tier beneath, it must be secured by an additional tiedown that runs forward at an angle not more than 45 degrees to the horizontal, whenever practicable. This tiedown must pass either through the rear pipe of the upper tier or outside it and over both longitudinal tiedowns.

- (f) Securing large pipe, with an inside diameter over 1143 mm (45 in). In addition to the requirements of paragraphs (b), (c) and (d) of this section, the following rules must be satisfied:
- (1) The front pipe and the rear pipe must be immobilized by blocking, wedges, vehicle end structure, stakes,

locked pipe unloader or other equivalent means.

- (2) Each pipe must be secured by tiedowns through the pipe:
- (i) At least one tiedown through each pipe in the front half of the load, which includes the middle one if there are an odd number, and must run rearward at an angle not more than 45 degrees with the horizontal, whenever practicable.
- (ii) At least one tiedown through each pipe in the rear half of the load, and must run forward at an angle not more than 45 degrees with the horizontal, whenever practicable, to hold each pipe firmly in contact with adjacent pipe; and
- (iii) If the front or rear pipe is not also in contact with vehicle end structure, stakes, a locked pipe unloader, or other equivalent means, at least two tiedowns positioned as described in paragraphs (f), (2), (i) and (ii) of this section, must be used through that pipe.

- (3) If one pipe is transported, or if several pipes are transported without contact between other pipes, the requirements in this paragraph apply to each pipe as a single front and rear article.

## Definitions

**Aggregate Working Load Limit** – The summation of the working load limits or restraining capacity of all devices used to secure an article of cargo on a vehicle.

**Bell Pipe Concrete** – Pipe whose flanged end is of larger diameter than its barrel.

**Blocking** – A structure, device or another substantial article placed against or around an article of cargo to prevent horizontal movement of the article of cargo. This may include structures, chocks and wedges. Pipe unloaders should not be used for blocking.

**Tie Down** – 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).

**Well** – The depression formed between two cylindrical articles of cargo when they are laid with their eyes horizontal and parallel against each other.

**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.

**Conditions of Low Friction** – The securement of concrete pipe relies on a high coefficient of friction. Snow frozen to pipe, ice or snow on deck may create conditions of low friction and should be removed before loading to improve the friction.

**Bundled Concrete Pipe** – Pipe with I.D. of less than 12-inches is generally bundled and palletized. For securement requirements, refer to Sec. 393.100 to 393.120.

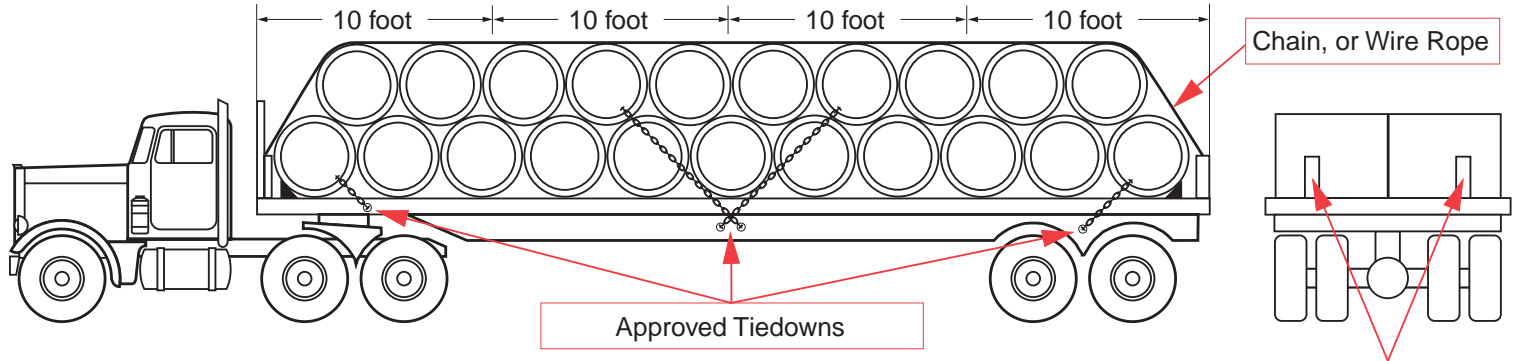
**Figure 1 - With an inside diameter up to 45 inches with a continuous top layer.**

One 1/2-Inch Diameter Chain or Wire Rope

or

Two 3/8-Inch Diameter Chains or Wire Ropes

If pipe is not secured individually, then the appropriate number of longitudinal tiedowns, one 1/2-inch diameter chain or wire rope or two 3/8-inch diameter chains or wire ropes must be used over each group of pipe, with transverse tiedown for every 10 feet of load length. These transverse tiedowns may either go through pipe in the top tier, or may pass over the longitudinal tiedowns to ensure they exert pressure on pipe in the top tier.



**NOTES:** Chain and cable ratings should approximate load weight.

Cable and chain for securement must be tagged and easily identified with working load capacity.

**Transverse tiedowns shall run at an angle of not more than 45 degrees with the horizontal whenever practicable.**

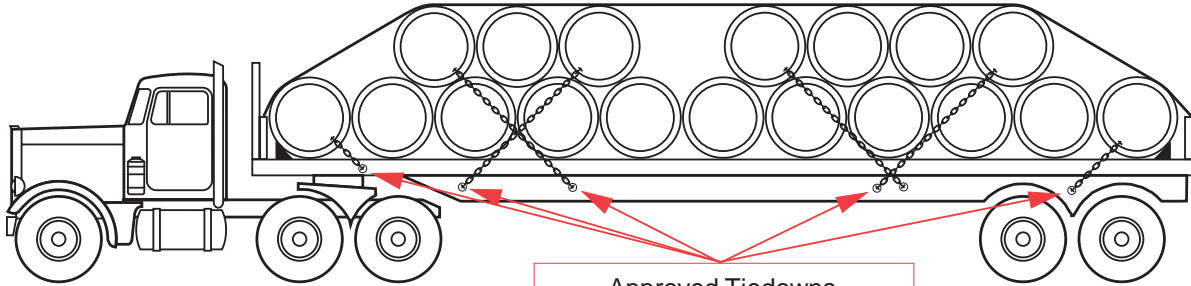


**Figure 2 - Pipe with inside diameter up to 45 inches with gaps on top layer.**

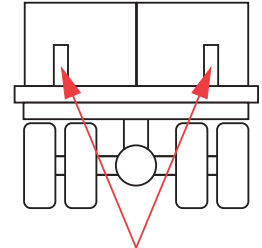
One 1/2-Inch Diameter Chain or Wire Rope

or

Two 3/8-Inch Diameter Chains or Wire Ropes



Approved Tiedowns



Pipe Unloader

**NOTES:** Chain and cable ratings should approximate load weight.

Cable and chain for securement must be tagged and easily identified with working load capacity.

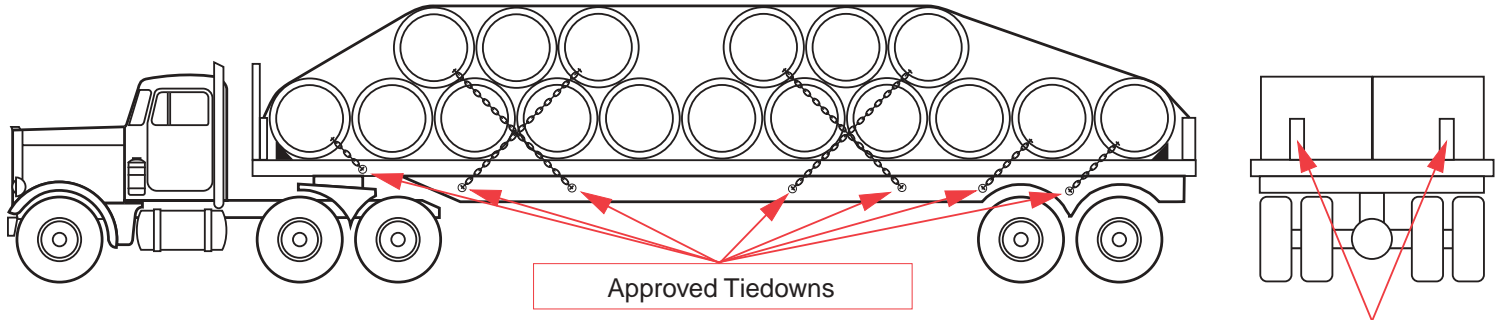
**Transverse tiedowns shall run at an angle of not more than 45 degrees with the horizontal whenever practicable.**

**Figure 3 - Pipe with inside diameter up to 45 inches with gaps on top layer.**

One 1/2-Inch Diameter Chain or Wire Rope

or

Two 3/8-Inch Diameter Chains or Wire Ropes

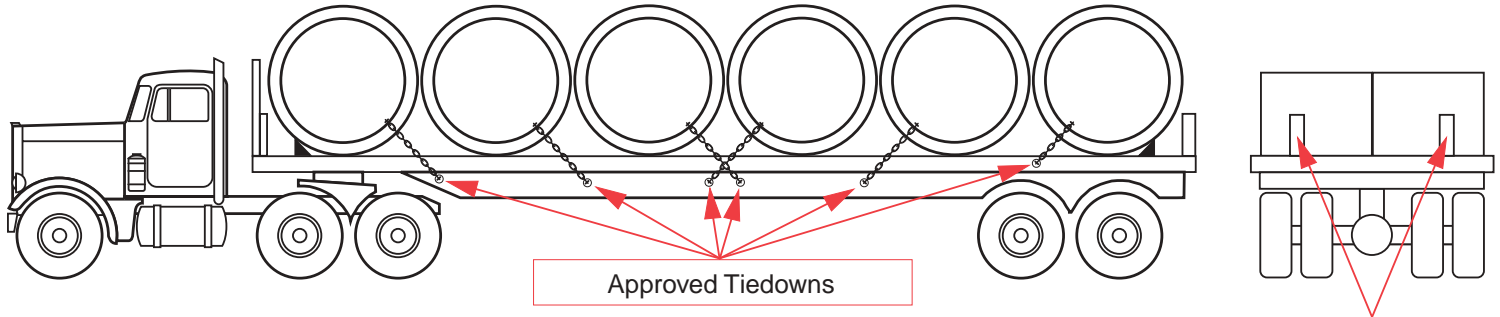


**NOTES:** Chain and cable ratings should approximate load weight.

Cable and chain for securement must be tagged and easily identified with working load capacity.

**Transverse tiedowns shall run at an angle of not more than 45 degrees with the horizontal whenever practicable.**

**Figure 4 - Pipe with inside diameter over 45 inches with a continuous layer.**

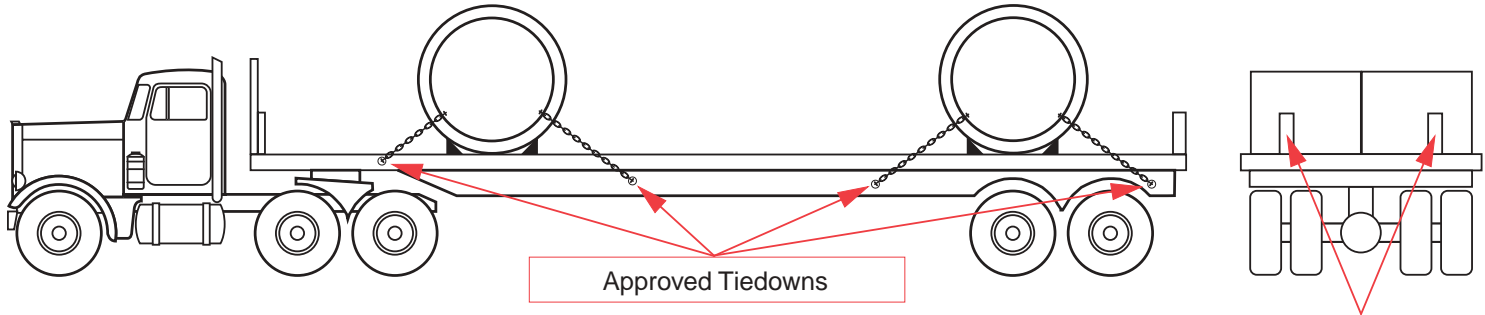


**NOTES:** Chain and cable ratings should approximate load weight.

Cable and chain for securement must be tagged and easily identified with working load capacity.

**Transverse tiedowns shall run at an angle of not more than 45 degrees with the horizontal whenever practicable.**

Figure 5 - Pipe with inside diameter over 45 inches with gaps.

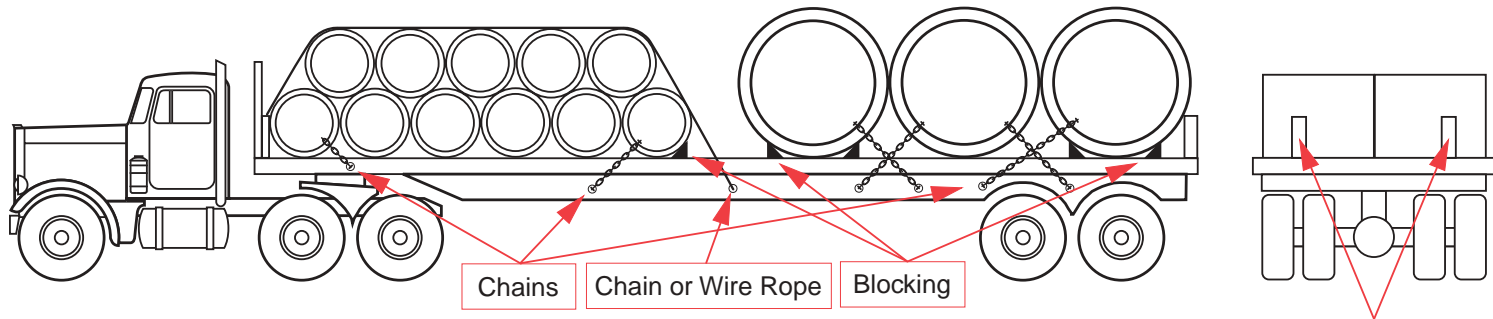


**NOTES:** Chain and cable ratings should approximate load weight.  
Cable and chain for securement must be tagged and easily identified with working load capacity.  
**Transverse tiedowns shall run at an angle of not more than 45 degrees with the horizontal whenever practicable.**

**Figure 6 - Arranging a mixed load (Refer to Sec. 393.124 (d) arranging a load).**

The arrangement of a mixed load of pipe affects how it can be secured, and affects the effectiveness of securement.

Where pipe of different diameters are carried, groups of pipe must be formed that consist only of pipe of the same diameter. Each group must be secured separately to the full requirements of this section.



**NOTES:** Chain and cable ratings should approximate load weight.

Cable and chain for securement must be tagged and easily identified with working load capacity.

**Transverse tiedowns shall run at an angle of not more than 45 degrees with the horizontal whenever practicable.**



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