



Shifting and Falling Cargo

The Federal Motor Carrier Safety Administration (FMCSA) has issued regulations dealing with protection against shifting and falling cargo in commercial motor vehicles. The new cargo securement standards, require motor carriers to change the way they use cargo securement devices to prevent cargo from shifting on or within, or falling from commercial motor vehicles.

In some cases, the changes may require motor carriers to increase the number of tiedowns used to secure certain types of cargoes. However, the regulation generally does not prohibit the use of tiedowns or cargo securement devices currently in use.

The new standards address all types of articles of cargo, except commodities in bulk that lack a fixed shape or structure (sand, gravel, liquids, etc.) that are transported in a device that forms part of the structure of the commercial motor vehicle (hopper, tank, etc.). In general, the standards address:

- Cargo placement and restraint.
- Minimum strength of cargo securement devices and systems.
- How the working load limit of a tiedown is determined.
- How to determine the minimum number of tiedowns required.

The new standards also address specific securement requirements for certain commodities including:

- Logs.
- Dressed lumber.
- Concrete pipe.
- Intermodal containers.
- Heavy vehicles, equipment, and machinery..
- Roll-on/roll-off or hook lift containers.
- Large boulders.

This final rule, published in the Sept. 27 *Federal Register*, is effective Dec. 26, 2002 and can be viewed by searching for docket number FMCSA-97-2289 at <http://dms.dot.gov/>. Motor carriers have until Jan. 1, 2004 to comply with the standard.

Three general areas of change that affect PENNSYLVANIA LUMBERMENS MUTUAL customers when transporting cargo are Securement System, Blocking and Bracing, and Front End Structures. Excerpts from the current legislation have been included in this bulletin for your review. PLM strongly encourages all clients to secure a copy of the legislation and review the requirements as they apply to your individual operations.



Securement Systems

The rules in this section apply to tiedown assemblies (including chains, cables, steel straps, and fiber webbing), other securement devices, and attachment or fastening devices used in conjunction therewith, which are used to secure cargo to motor vehicles in transit.

(a) Tiedown assemblies. Except for integral securement devices of containers designed for the transportation of containerized, intermodal cargo which conform to the rules in the aggregate working load limit of the tiedown assemblies used to secure an article against movement in any direction must be at least 1/2 times the weight of the article

(b) Steel strapping. Steel strapping used as a component of a tiedown assembly must conform to the requirements of the 1991 edition of the American Society for Testing and Materials' Standard Specification for Strapping, Flat Steel and Seals, ASTM D3953-91. Steel strapping, which is not marked by the manufacturer with a working load limit, shall be considered to have a working load limit equal to 1/4 of the breaking strength listed in ASTM D3953-91. Steel strapping that is one inch wide or wider must have at least two pairs of crimps in each seal and when an end-over-end lap joint is formed, it must be sealed with at least two seals.

(c) Chain. Chain used as a component of a tiedown assembly must conform to the requirements of the June 15, 1990, edition of the National Association of Chain Manufacturers' Welded Steel Chain Specifications applicable to all types of chain.

(d) Webbing. Webbing used as a component of a tiedown assembly must conform to the requirements of the 1991 edition of the Web Sling and Tiedown Association's Recommended Standard Specification for Synthetic Webbing Tiedowns

(e) Wire rope. Wire rope used as a component of a tiedown assembly must conform to the requirements of the November 1985 second edition of the Wire Rope Technical Board's Wire Rope Users Manual. Wire rope, which is not marked by the manufacturer with a working load limit, shall be considered to have a working load limit equal to 1/4 of the nominal strength listed in the Wire Rope Users Manual.

(f) Cordage. Cordage used as a component of a tiedown assembly, must conform to the applicable Cordage Institute rope standards listed below: PETERS-2, Polyester Fiber Rope, 3-Strand and 8-Strand Constructions, January, 1993; PPRS-2, Polypropylene Fiber Rope, 3-Strand and 8-Strand Constructions, August, 1992; CRS-1, Polyester/Polypropylene Composite Rope Specifications, Three- and Eight-Strand Standard Construction, May 1979; NRS-1, Nylon Rope Specifications, Three- and Eight-Strand Standard Construction, May 1979; C1, Double Braided Nylon Rope Specifications, DBN-January 1984.

(g) Working load limits. The working load limits are to be as listed by the manufacturer with the working load limit marked on the tiedown material. Tiedown materials shall be considered to have a working load limit equal to the value for which they are marked.

Synthetic cordage (e.g., nylon, polypropylene, polyester) which is not marked or labeled to enable identification of its composition or working load limit shall be considered to have a working load limit equal to that for polypropylene fiber rope.

(h) Load binders and hardware. The strength of load binders and hardware that are part of, or used in conjunction with, a tiedown assembly must be equal to, or greater than the minimum strength specified for that tiedown assembly.

(i) Attachment to the vehicle. The hook, bolt, weld, or other connector by which a tiedown assembly is attached to a vehicle, and the mounting place and means of mounting the connector, must be at least as strong as the tiedown assembly when that connector is loaded in any direction in which the tiedown assembly may load it.

(j) Winches or other fastenings. The anchorages of a winch or other fastening device mounted on a vehicle and used in conjunction with a tiedown assembly must have a combined tensile strength equal to, or greater than, the strength of the tiedown assembly.

(k) Adjustability. A tiedown assembly and its associated connectors and attachment devices must be designed, constructed, and maintained so that the driver of an in-transit vehicle can tighten them.

Blocking and Bracing

(a) Protection against longitudinal movement. When a motor vehicle carries cargo that is not firmly braced against a front-end structure so that, when the vehicle decelerates at a rate of 20 feet per second per second, the cargo will remain on the vehicle and will not penetrate the vehicle's front-end structure.

(b) Protection against lateral movement. When a vehicle carries 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.

Front-End Structure

(a) Every cargo-carrying motor vehicle must be equipped with a headerboard or similar device of sufficient strength to prevent load shifting and penetration or crushing of the driver's compartment.

(b) Location. The front-end structure must be located between the vehicle's cargo and the vehicle's driver.

(c) 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 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 item of cargo being transported on the vehicle, whichever is narrower.

(d) Strength. The front-end structure must be capable of withstanding a generated horizontal forward static load.

For a front-end structure less than 6 feet in height, a horizontal forward static load equal to one half (1/2) of the weight of the cargo being transported on the vehicle uniformly distributed over the entire portion of the front-end structure that is within 4 feet above the vehicle's floor or that is at or below a height above the vehicle's floor at which it blocks forward movement of any item of the vehicle's cargo, whichever is less.

For a front-end structure 6 feet in height or higher, a horizontal forward static load equal to four-tenths (0.4) of the weight of the cargo being transported on the vehicle uniformly distributed over the entire front-end structure.

(e) Penetration resistance. The front-end structure must be designed, constructed and maintained so that it is capable of resisting penetration by any item of cargo that contacts it when the vehicle decelerates at a rate of 20 feet per second per second. The front-end structure must have no aperture large enough to permit any item of cargo in contact with the structure to pass through it.

(f) Substitute devices. The requirements of this section 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 cargo at least equal to, a front-end structure, which conforms, to those requirements.

Several additional areas to review when securing loads from shifting and falling, include the inspection of the load within the first 50 miles of travel and the necessity to properly secure the load being transported with an adequate number of tiedowns.

The vehicle operator within the first 50 miles of travel should inspect all loads. Research has indicated that conditions of the securement system, which would require the driver to make readjustments, are more likely to occur after the vehicle has been driven between 25 and 50 miles. Most loads if improperly loaded, will shift within this travel distance.

One additional area of concern that is observed during roadside inspections involves the number of tiedowns. Flatbed trailer inspections reveal that motor carriers do not use enough tiedowns, even though there are ample available on board the vehicle. All single loads should be secured with a minimum of 2 tiedowns. The minimum spacing between the tiedowns should be between 4 and 10 feet on center depending on the load configuration.

In presenting this overview of the current change in legislation and trending in cargo related losses, Pennsylvania Lumbermens Mutual Insurance Company is informing clients of changes in requirements of motor carrier safety regulations. Meeting these

standards will help to ensure that commercial motor vehicle loads are properly secured that will lead to a reduction in the number of accidents caused by cargo shifting from or falling from trucks.