

**Improper Loading And Securement Of Loads:
Another Road To Liability Success In Trucking Cases**

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I. Introduction

The number of injuries and deaths involving trucking related accidents is staggering. Over 400,000 accidents occur each year involving tractor trailer trucks or other commercial vehicles. A person is injured or killed every 16 minutes in a tractor trailer truck accident¹. These unfortunate statistics are frequently the result of improper loading and securement of loads of tractor trailers.

When a truck driver loses control of a tractor trailer and a wreck occurs, a thorough investigation may reveal that factors, other than negligent driving, caused the wreck. It is possible that the cause of the wreck was due to the tractor trailer being over loaded, improperly loaded, or the load being improperly secured. The load must be properly balanced on or in the trailer so that it will not shift while in transit. Crashes occur because the truck is thrown off balance when heavy loads shift within trailers, or on top of flatbeds, or lowboys. These tragic accidents can be avoided by ensuring that the freight is properly loaded and secured.

The most effective way to avoid trucking accidents is to properly train the drivers to properly load and secure the cargo. It is the driver's responsibility to inspect the truck for safety. Further, the driver should examine the cargo placement and securement because he or she, along with the

¹ www.truckinginfo.net

employer, are responsible for the safe loading of the cargo, regardless of who loaded it, unless the cargo is in a locked trailer for which he has no access. This means that the driver is responsible for knowing the weight of the load, safe placement of the load, and safe securement of the load.

Federal Motor Carriers Safety Regulations clearly outline the carrier's responsibility for proper loading of a truck. Commercial vehicles must be loaded in such a manner as to prevent its cargo from leaking, spilling, blowing, or falling from the vehicle. The cargo must be immobilized or secured to prevent shifting to the extent that the vehicles stability or maneuverability is affected. The Federal Motor Carrier Safety Regulations mandate the following standards of care regarding loading:

§ 392.9 Inspection of cargo, cargo securement devices and systems.

(a) General. A driver may not operate a commercial motor vehicle and a motor carrier may not require or permit a driver to operate a commercial vehicle unless -

(1) The commercial vehicle's cargo is properly distributed and adequately secured as specified in §§ 393.100 through 393.136 of this subchapter.

(2) The commercial motor vehicle's tailgate, tailboard, doors, tarpaulins, spare tire and other equipment used in its operation, and the means of fastening the commercial motor vehicle's cargo, are secured; and

(3) The commercial motor vehicle's cargo or any other object does not obscure the driver's view ahead or to the right or left sides (except the drivers of self-steer dollies), interfere with the free movement of his/her arms or legs, prevent his/her free and ready access to accessories required for emergencies, or prevent the free and ready exit of any person from the commercial motor vehicle's cab or driver's compartment.

(b) Drivers of trucks and truck tractors. Except as provided in paragraph (b)(4) of this section,

the driver of a truck or truck tractor must -

(1) Assure himself/herself that the provisions of paragraph (a) of this section have been complied with before he/she drives that commercial motor vehicle;

(2) Inspect the cargo and the devices used to secure the cargo within the first 50 miles after beginning a trip and cause any adjustments to be made to the cargo or load securement devices as necessary, including adding more securement devices, to ensure that cargo cannot shift on or within, or fall from the commercial motor vehicle; and

(3) Reexamine the commercial motor vehicle's cargo and its load securement devices during the course of transportation and make any necessary adjustment to the cargo or load securement devices, including adding more securement devices, to ensure that cargo cannot shift on or within, or fall from the commercial carrier vehicle. Reexamination and any necessary adjustments must be made whenever -

(i) The driver makes a change of his/her duty status; or

(ii) The commercial motor vehicle has been driven for 3 hours; or

(iii) The commercial motor vehicle has been driven 150 miles, whichever occurs first.

(4) The rules in this paragraph (b) do not apply to the driver of a sealed commercial motor vehicle who has been ordered not to open it to inspect its cargo or to the driver of a commercial motor vehicle that has been loaded in a manner that makes inspection of its cargo impracticable.

[36 FR 18863, Sept. 23, 1971, as amended at 37 FR 12642, June 27, 1972; 38 FR 23522, Aug. 31, 1973; 60 FR 38746, July 28, 1995; 63 FR 33278, June 18, 1998; 67 FR 31224, Sept. 27, 2002; 72 FR 55703, Oct. 1, 2007]

There are also specific regulations that deal with specific types of cargo such as logs, boulders,

concrete pipes, metal coils, etc. contained in the FMCSR's. The driver of the commercial vehicle is charged with the responsibility of making sure that the truck is loaded in compliance with federal law. A driver cannot operate a commercial vehicle unless the load is properly distributed and adequately secured, the means of fastening cargo is secured, and the cargo does not obscure the drivers view or interfere with the movement of his arms or legs².

II. Physics of A Rollover

The ability of a heavy truck to successfully negotiate curves depends upon the vehicles speed, load stability, and geometry of the curve. When a rollover occurs, evaluation of factors related to the driver, the vehicle, the load placement, the load weight and securement, and the roadway are required. When a truck travels in a curved path, it leans to the outside of the curve. This leaning is caused by the centrifugal force acting through the truck's center of gravity. The truck will rollover away from the center of the curve if the centrifugal force is large enough. The centrifugal force increases with speed and curvature of the road.

Physicists state that the measure of a truck's ability to resist rollover is given by it's "rollover threshold." The rollover threshold is the lowest value of centrifugal acceleration which causes the truck to tip over when driven steadily in a curved path. A representative survey of test data found the rollover threshold of heavy trucks is in the .25 to .5 g range. Trucks with lower payloads (lower centers of gravity) and more firm suspensions have higher rollover thresholds and are more difficult to flip over in a curve³. Until the rollover threshold becomes sufficiently large, the vehicle will have a tendency to slide out of a curve rather than rollover. For example, Indianapolis race cars rarely flip

² 49 CFR § 392.9 (a)

³ Safety Bulliten, Triodyne, Inc. Volume 6, No. 1, October 1997.

over in a curve but frequently slide or spin out while negotiating a curve at high speed. To the contrary, top heavy trucks will flip over rather than spinning out, sometimes causing injuries and damages to adjacent drivers.

Truck rollovers typically occur at exit and entrance ramps of expressways or interstates. The driver may be unfamiliar with the sharpness of a ramp curve and enter it at an excessive speed. Besides unfamiliarity with the terrain, darkness, bad weather, poor visibility, travel fatigue, or impairment by substances may contribute to the driver's misjudgment which results in the rollover. Improper loading and securement of loads may constitute a causative factor leading to the rollover. Often times drivers of trucks who have survived rollover incidents state that they did not realize they were rolling until they looked in the side view mirror and saw the trailer wheels on the inside of the curve lift off the ground, followed by the tractor suddenly tipping over. The delayed rolling of the tractor is due to the higher center of gravity of the trailer and the flexibility of the trailer structure. Frequently, the trailer will begin to twist and begin rolling while the tractor wheels briefly stay in contact with the road. Forces will be transmitted to the fifth wheel coupling of the tractor and eventually flip the tractor over. Sometimes truck drivers feel that the main load shifted and caused their truck to suddenly flip over. This is frequently true, however, it is more common for the load to shift due to the extreme tilting of the trailer that occurs during the rollover. Thus load shifting during a rollover is frequently a result, not the cause of the wreck.

When a rollover event occurs, a number of factors must be investigated by the plaintiff's lawyer or investigator (such as the highway patrol or accident reconstructionist). Possible contributing driving factors include:

1. Entering of a curve at excessive speed;
2. Failing to anticipate or be familiar with sharpness of curve;

3. Steering onto a soft shoulder;
4. Leaving the roadway and abrupt overcorrection;
5. Accelerating too fast through a curve;
6. Center of gravity too high - inexperience;
7. Abrupt steering maneuver during avoidance;
8. Driver impairment by fatigue, drowsiness, alcohol, drugs, impaired visibility due to weather conditions or diminished eye sight;
9. Human factors such as uncontrolled emotions; and
10. Lack of familiarity with handling capabilities of a tractor trailer.

Vehicle factors to consider include:

1. High center of gravity/top heavy load;
2. Overloaded/collapsed suspension;
3. Under inflated tires;
4. Shifting of load;
5. Improper cargo distribution;
6. Deficiency in brake performance before entering curve due to brake defect or improper loading distribution;
7. Improper load securement; and
8. Impaired steering due to improper load placement.

Highway factors to consider include:

1. Speed limitations for the curve;
2. Elevation/banking;
3. Shoulder condition;
4. Transition curvature.

III. Height Limits

The height of the vehicle's center of gravity is important for safe handling. Thus, trucks are subject to height limits. The height limit for travel on interstates is usually 13 and 1/2 feet, measured from the surface the vehicle stands upon. Too much cargo weight at the top of the truck can have a dramatic destabilizing effect because it is at the end of a 13 1/2 foot lever, which can trip over the truck. For stability, professional truck drivers must keep the center of gravity low. If the center of gravity is higher, the truck is more likely to tip. The heaviest pieces of cargo must be loaded on the bottom.

IV. Weight Distribution

It is the responsibility of the driver to ensure that the tractor trailer rig has the proper weight distribution. Gross Weight is the total weight of the tractor and trailer in addition to the load. Gross Combination Weight is the total weight of the trailer or trailers in addition to the cargo, along with the power unit. The GVW or GCW limits are set by each state. On national interstates and defense highways the Gross Combination Weight maximum allowed is 80,000 pounds. Moreover the axle weight must not be exceeded. Axle weight is the weight of any axles (or combination of axles) transmitted to the ground. Examples of common axle weight limits for states are: tandem axle 34,000 pounds, single axle 20,000 pounds, and steering axle 12,000 pounds.

Another consideration is weight rating assigned by manufactures. Gross Vehicle Weight Rating, or GVWR, assigned by the manufacturer is defined as the weight of a single vehicle plus cargo. A Gross Combination Weight Rating, or GCWR, is assigned to a tractor with it's trailer or trailers and the load. These ratings state how much weight the vehicle can support safely. Tire suspensions and coupling devices also have weight ratings. Exceeding the weight rating is illegal, negligent, and dangerous because it can cause braking, handling, and steering instability.

V. Weight and Balance

Poor weight distribution can make vehicle handling unsafe. The driver, load master, or materials handler must preplan how to load the trailer. Factors such as weight of boxes, or pallets, and the order in which deliveries are being made all must be considered. Thus, in loading tractor trailers the higher the center of mass, the less stable the load. Therefore, the cargo must be loaded with the heavy pieces on the bottom and the lighter pieces on top. Vehicle handling, especially in

curves or in quick maneuvers is improved with a lower center of mass⁴.

Shifting cargo can pose a safety hazard. Professional truck drivers are required to be familiar with the regulations contained in Subpart 1 § 393.100 Which types of commercial motor vehicles are subject to cargo securement standards of this subpart, and what general requirements apply?

(a) Applicability. The rules in this subpart are applicable to trucks, truck tractors, semitrailers, full trailers, and pole trailers.

(b) Prevention against loss of load. Each commercial motor vehicle must, when transporting cargo on public roads, be loaded and equipped, and the cargo secured, in accordance with this subpart to prevent the cargo from leaking, spilling, blowing or falling from the motor vehicle.

(c) Prevention against shifting of load. Cargo must be contained, immobilized or secured in accordance with this subpart to prevent shifting upon or within the vehicle to such an extent that the vehicle's stability or maneuverability is adversely affected.

[67 FR 61226, Sept. 27, 2002].

The Federal Motor Carrier Safety Regulations contain a whole series of regulations concerning protection against shifting and falling cargo. Specific requirements for each type of tie down are found in the Commercial Vehicle Safety Alliance Cargo Securement Tie Down Guidelines and the Federal Motor Carriers Safety Regulations Cargo securement is required under Part 393, Subpart I of the FMCSR:

- § 393. 102 provides specific minimum criteria for cargo securement devices and systems, including performance and breaking strength criteria, working load limits, performance criteria to prevent vertical movement of loads, and the minimum number

⁴ Truck & Trucking Handbook: A Primer, Ruhl & Associates Forensic, Inc. Copyright Champaign, IL 2000 p. 138

of tie downs, etc.

- § 393.116 provides rules for securing logs.
- § 393.104 provides for standards cargo, driver and system must meet.
- § Section 393.118 provides rules for securing dressed lumber or similar building products.
- § 393.120 provides rules for securing metal coils.
- § 393.122 provides rules for securing paper rolls.
- § 393.124 provides rules for securing concrete pipe.
- § 393.126 provides rules for securing intermodal containers.
- § 393.128 provides rules for securing automobiles.

These rules set out a written standard of care for drivers, and shippers and loaders.

VI. Case Law Regarding Loading

Whenever a member of the public is injured because of a negligent load of cargo, both the shipper, its employees who loaded the cargo, the common carrier, and the driver may be held liable for the injury. Burke vs. JF Allen Company, 182 F. 3rd 907 (West. Va. 1999); Skeie vs. Mercer Trucking Co., Inc. 61 P. 3rd 1207 (2003). A shipper who assumes responsibility for loading the vehicle can be held liable, along with the driver, for improperly securing the load, under a common law theory of negligence. Federal regulations, the FMCSR, provides detailed guidelines and methodology for securing loads, and provides evidence of the proper standard of care to be used by the shipper in loading the vehicle. Reed vs. Ace Doran Hauling & Rigging Company., 1997 WL 177849 (N. D. Ill. 1997); Symington vs. Great Western Trucking Company, Inc., 668 F. Supp. 1278 (S. D. Iowa 1987); Locicero vs. Interpace Corp., 266 N. W. 2nd 423 (Wis. 1978).

If the trailer is sealed before it is picked up by the motor carrier, it is presumed that the shipper participated in the loading process. Miller vs. Rowlands Leasing Corp 1999 WL 739539 (Ohio 1999). Thus, even though the driver is excused from inspecting the load by the FMCSR, if the cargo is sealed and the driver has no access to the load, 392.9 (b)(4) the shipper who loaded and sealed the trailer may be liable. Burke, Supra.

VII. Inspecting and Securing Loads

All cargo including tarp loads must be inspected for security by the driver in transit according to FMCSR part 392.9. Once the driver is on the road he must check the load often. Drivers should look closely at all wood bracing and supports to make sure that none of the nails are pulling away. Also each chain should be tested. If there is slack, the driver should open the binder and tighten. The first load inspection should be completed within the first 50 miles, then reexamined after 3 hours, or after driving 150 miles, or at a change of duty status whichever occurs first⁵.

The only exception to FMCSR part 392.9 is in the instance of sealed cargo. When the tractor is sealed and the driver has no access to it, such as a key or a padlock, FMCSR § 392.9 (b)(4) states that “the driver has no responsibility for the proper loading and securement.” That responsibility lies with whoever actually loaded and secured the load.

Load Securement Methods

The most common methods used to secure loads on platform trailers are cables and wenchers, webbing straps and wenchers, chains and load binders. Regulations require that the working load limit of all tie downs must be at least ½ times the weight of the cargo being tied down. Examine the

⁵ Byrnes, Mike, & Associates, *Bumper to Bumper: The Complete Guide to Tractor Trailer Operations*, 4th ed., 2006, p. 371; FMCSR § 393.9 (h)(2)(3).

guidelines in Federal Motor Carriers Safety Regulation part 393.110 to determine the minimum number of tie downs needed, as well as the other requirements regarding the securement devices.

Boxes, Sacks and Load Locks

Some cargo loads consist of boxes or sacks. If the boxes stacked across the van do not cover the distance from wall to wall, then tiered stacking can be used where the first row touches the left hand side of the van and the second row touches the right hand side of the van, alternating up to the roof. This stacking method minimizes load shifting. Securing loads inside of a trailer of the van type is less challenging than securing loads on platforms, lowboys, and open trailers. The body of the van provides some stability for the load. Also, these vans contain a device called a “load lock” that can be used to provide extra stability. Load locks are long poles that cover the width of the trailer. The ends of these devices can be adjusted with a jack like mechanism to hold them in place.

Loading Liquid Tank Trucks

Loading liquid tankers can pose special problems for the driver. First of all, the driver needs to ascertain where the baffles are located. In some tanker trucks there are baffles to prevent the liquid load from shifting from front to back and vice versa but not from side to side. Thus, taking a turn too rapidly can result in liquid shifting from one side of the tank to the other causing the trailer to tip over. Some tanks must be filled to a greater degree because a tanker truck not filled sufficiently can cause more sloshing around of the cargo, which can cause the trailer to tip over. On the other hand, some liquids expand with heat, therefore, room to expand when the liquids become warm must be provided.

VIII. Chains and Binders

Some steel pipe, heavy steel beams, heavy machinery, rubber tired vehicles, and construction

equipment are best secured by chains. The purpose of using chains is to hold the load down and prevent it from moving sideways, forward, or backward. “Binder levers” are used to tighten up the chain, blocks, and braces. In addition to chains and binders, drivers or material handlers may need to use blocks of wood to keep machinery mounted on wheels from moving. Again, the Code of Federal Regulations specify a 4x4 inch wood as a minimum size, which must be nailed to the wood floor. Tarps must be used to protect platform loads. This is to protect people from spillable cargo.

IX. Driver Training

Many drivers study JJ Keller’s Tractor Trailer Driver Training Manual 2nd Edition 2008. According to the Keller Manual, the cargo must be firmly immobilized or secured. There are several methods and devices that can be used for cargo securement, such as blocking, bracing, dunnage, load locking bars, tie down assemblies, and tarps.⁶ Professional drivers can be cross examined using the Keller Manual as a tool. The Keller Manual stresses safe loading responsibilities that state, “you are responsible for making sure your vehicle is loaded safely and legally. It must meet all cargo securement and weight distribution requirements⁷.” Overloading can adversely affect the vehicle’s steering, braking, and speed control. An overloaded truck moves slowly on upgrades and can gain too much speed on down grades. Stopping distance increases and brakes can fail if worked to hard. Drivers must be trained in and exercise these concepts in safe loading.

X. Summary

In summary, the plaintiff’s lawyer who handles trucking cases should sue all entities and persons who may have been involved in the loading and securing of the load which destabilized the

⁶ JJ Keller Tractor Trailer Driving Manuel Neenah, Wisconsin Copyright 2008 pg 352 - 356

⁷ Id ibid 352

truck or shifted the load, resulting in injuries and damages. Moreover, all documents and materials pertaining to those entities or persons who loaded or drove the tractor trailer should be obtained through discovery. Every person involved in loading and securement of the cargo should be deposed. Negligence regarding cargo loading and securement may become a fruitful liability avenue for the trucking lawyer to pursue. Written standards of care can make proof of negligence in this area trucking liability cases less challenging.