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Development of a North American Standard for Protection Against Shifting and Falling Cargo; Final Rule

DEPARTMENT OF TRANSPORTATION

Federal Motor Carrier Safety Administration

49 CFR Parts 392 and 393

[FMCSA Docket No. FMCSA–97–2289]

RIN 2126–AA27

Development of a North American Standard for Protection Against Shifting and Falling Cargo

AGENCY: Federal Motor Carrier Safety Administration (FMCSA), DOT.

ACTION: Final rule.

SUMMARY: The FMCSA revises its regulations concerning protection against shifting and falling cargo for commercial motor vehicles (CMVs) engaged in interstate commerce. The new cargo securement standards are based on the North American Cargo Securement Standard Model Regulations, reflecting the results of a multi-year comprehensive research program to evaluate current U.S. and Canadian cargo securement regulations; the motor carrier industry's best practices; and recommendations presented during a series of public meetings involving U.S. and Canadian industry experts, Federal, State and Provincial enforcement officials, and other interested parties. The new rules require motor carriers to change the way they use cargo securement devices to prevent articles from shifting on or within, or falling from, CMVs. In some instances, the changes may require motor carriers to increase the number of tiedowns used to secure certain types of cargoes. However, the rule generally does not prohibit the use of tiedowns or cargo securement devices currently in use. Therefore, motor carriers are not required to purchase new cargo securement equipment to comply with the rule. The intent of this rulemaking is to reduce the number of accidents caused by cargo shifting on or within, or falling from, CMVs operating in interstate commerce, and to harmonize to the greatest extent practicable U.S., Canadian, and Mexican cargo securement regulations.

DATES: The rule is effective December 26, 2002. Motor carriers must ensure compliance with the final rule by January 1, 2004. The publications incorporated by reference in this final rule are approved by the Director of the Federal Register as of December 26, 2002.

FOR FURTHER INFORMATION CONTACT: Mr. Larry W. Minor, Office of Bus and Truck Standards and Operations, MC–PSV, (202) 366–1790; or Mr. Charles E. Medalen, Office of the Chief Counsel, MC–CC, (202) 366–1354, Federal Motor Carrier Safety Administration, 400 Seventh Street, SW., Washington, DC 20590–0001. Office hours are from 7:45 a.m. to 4:15 p.m., e.t., Monday through Friday, except Federal holidays.

SUPPLEMENTARY INFORMATION:

Background

On July 27, 1993, the House of Representatives held a hearing concerning the adequacy of Federal regulations on cargo securement, as well as the enforcement of those regulations (''Truck Cargo Securement Regulations and Enforcement, 1993: Hearing Before the Subcommittee on Investigations and Oversight of the House of Representatives' Committee on Public Works and Transportation,'' 103rd Cong., 1st Sess. 32 (1993)). The report of the July 1993 hearing is included in the public docket. The hearing was prompted by several cargo securement accidents that occurred in New York between 1990 and 1993. During the hearing, the Federal Highway Administrator stated that the Ontario Ministry of Transportation had requested that the FHWA review a proposal prepared on behalf of the Canadian Council of Motor Transport Administrators (CCMTA)—a non-profit association of senior officials from Federal, Provincial, and Territorial departments and agencies responsible for the administration, regulation, and control of motor vehicle transportation and highway safety—for a research program to evaluate cargo securement regulations and industry practices. The Administrator informed the subcommittee that the FHWA would participate in the research effort and consider incorporating the results of the research into the FMCSRs.

A cargo securement research working group was organized by the CCMTA and the Ontario Ministry of Transportation to discuss the research methodology with industry groups and Federal, State, and Provincial governments from the United States and Canada. The working group, which included representatives from the FHWA, Transport Canada (the Federal department responsible for developing and enforcing the regulatory aspects of motor vehicle and motor carrier safety in Canada), the CCMTA, the Commercial Vehicle Safety Alliance (CVSA), several States and Provinces, and U.S. and Canadian industry, held its first meeting August 16–17, 1993. The cargo securement issues that were to be examined through the research program and the selected research methodology are described in a report published by the Ontario Ministry of Transportation in November of 1993. A copy of the minutes of the first meeting and a copy of the report entitled ''A Proposal for Research to Provide a Technical Basis for a Revised National Standard on Load Security for Heavy Trucks'' are included in the public docket.

The North American Load Security Research Project was initiated to develop an understanding of the mechanics of cargo securement on heavy trucks. The research was intended to provide a sound technical basis for development of the North American Cargo Securement Standard Model Regulations. Tests were conducted to examine the fundamental issues of anchor points, tiedowns, blocking and friction, and issues related to securement of dressed lumber (representative of cargoes that are loaded lengthwise on a vehicle and secured with transverse tiedowns), large metal coils, concrete pipe, intermodal containers, and other commodities. A copy of the research reports is in the public docket. Copies of these reports may be purchased from the CCMTA, 2323 St. Laurent Boulevard, Ottawa, Ontario K1G 4J8. The telephone number for the CCMTA is 613–736–1003; the Web site address is *http://www.ab.org/ccmta/ccmta.html.*

As various portions of the research were completed, the results were provided to the Standard Drafting Group which was responsible for leading the effort at drafting the North American Model Regulations. Almost all of the research was completed by late 1997, with a few remaining items completed in 1998. The drafting group was responsible for reviewing the draft research reports to determine how the information could best be used to improve specific cargo securement requirements in the U.S., Canada, and Mexico.

Process for Development of the North American Model Regulations

The Standard Drafting Group developed the outline for the model regulations with most of the detailed performance criteria added as the research reports were completed. Membership in the drafting group included representatives from the FHWA, Transport Canada, CCMTA, the Ontario Ministry of Transportation, Quebec Ministry of Transportation—Ontario and Quebec conducted most of the research—and the CVSA. The CVSA was included in the drafting group because it is an organization of Federal, State, and Provincial government

agencies and representatives from private industry in the United States, Canada, and Mexico dedicated to improvement of commercial vehicle safety. The membership of the drafting group was limited because there was an informal agreement among the interested parties that it would have been impractical to draft a technical document with a larger number of participants.

The process used for further developing this outline for the model regulations involved the North American Cargo Securement Harmonization Committee, a group that reviewed major portions of this outline as it was completed by the drafting group. Membership in the harmonization group was open to all interested parties in the U.S., Canada, and Mexico. This process was intended to ensure that all interested parties had an opportunity to participate in the development of the model regulations, and to identify and consider the concerns of the Federal, State, and Provincial governments, carriers, shippers, industry groups, and associations, as well as safety advocacy groups and the general public. The harmonization group held public meetings at locations in the United States and Canada, during which drafts of the North American Cargo Securement Standard were presented for review and comment. Representatives of the CCMTA and the CVSA served as co-chairpersons for the harmonization group and organized the public meetings. The meetings held in the U.S. concerning the review of substantive material that would be included in the model regulations were announced by the FHWA in the **Federal Register**. There were nine meetings held in the U.S. and Canada. Copies of the minutes from the meetings, including lists of the agencies, organizations and companies represented at the meetings, are in the public docket.

For individuals and groups unable to attend the meetings, the CCMTA posted information on the Internet. The Internet address is *http://www.ab.org/ccmta/ccmta.html.* Individuals and organizations with Internet electronic mail addresses were provided with the opportunity to have their names added to an electronic mailing list to receive information on the development of the standard.

After all interested parties were given the opportunity to comment and their concerns had been considered, the final version of the North American Cargo Securement Standard was published in May 1999 by the CCMTA. A copy of the standard is in the public docket. Federal, State, and Provincial governments throughout North America have now been encouraged to adopt it through their respective rulemaking processes.

Publication of Advance Notice of Proposed Rulemaking

On October 17, 1996 (61 FR 54142), the FHWA published an advance notice of proposed rulemaking (ANPRM) concerning the development of the North American Cargo Securement Standard Model Regulations. The agency requested comments on its consideration of a rulemaking to overhaul the Federal cargo securement regulations based on the research program described above and other published cargo-securement related research, such as Southern Illinois University's March 1995 report entitled ''Analysis of Rules and Regulations for Steel Coil Truck Transport.'' A copy of this report is included in the public docket. The agency also requested comments on the process that would be used to develop the North American Cargo Securement Standard Model Regulations.

Generally, the commenters agreed with the agency's plan to participate in the research program to evaluate cargo securement systems, and the approach the agency described for developing the North American Cargo Securement Standard Model Regulations. However, some of the commenters expressed concerns about specific issues they believe were not discussed adequately in the research and standards development program described in the ANPRM.

Publication of NPRM

On December 18, 2000, the agency published a notice of proposed rulemaking (NPRM) to adopt rules based on the North American Cargo Securement Standard Model Regulations (65 FR 79050). The NPRM requested comments on all aspects of the rulemaking.

Discussion of Comments to the NPRM

The agency received 102 comments in response to the NPRM. The commenters included individuals concerned about highway safety, truck drivers, motor carriers, motor carrier associations, manufacturers and shippers of products transported on trucks, truck trailer manufacturers, manufacturers of devices used to secure articles of cargo on commercial motor vehicles and several associations representing such manufacturers, and safety advocacy groups.

Generally, the majority of the commenters supported the concept of adopting the North American Cargo Securement Standard Model Regulations. However, almost all of the commenters suggested revisions of some of the requirements to make the proposed rule more consistent with the model regulations, and to improve the clarity of the requirements. A number of the commenters had objections to certain provisions of the model regulations that were proposed for adoption, suggesting that their concerns were not adequately addressed during the public meeting process used for developing the model regulations. The major issues are addressed below.

Applicability of Cargo Securement Rules

Several commenters expressed concerns about the applicability of the cargo securement rules to commercial motor vehicles with a gross vehicle weight less than 26,000 pounds. The National Association of Trailer Manufacturers stated:

> Our association is dedicated to promoting safety in trailers under 26,000 lbs GVWR [gross vehicle weight rating]. We focus on that segment of the trailer industry. We have observed repeatedly that regulations are written based on experiences of tractor-trailer rigs—the big ones—all over 26,000 lbs GVWR—and then are automatically applied to the much smaller and much different trailers.
>
> We respectfully submit that the major differences of frame structure, platform height, axle placements and towing methods are significant and they do affect handling, loading, and safety characteristics of these trailers.
>
> Therefore, our general concern and fear is that regulations are developed and applied to our segment of the industry without considering their real needs, designs and ultimate impact on manufacturing costs.
>
> We suggest that the rulemaking in this case of cargo securement be applied only to those trailers (over 26,000 lbs GVWR) where they are needed.

United Parcel Service, Inc. (UPS) also believes that there is insufficient data concerning the securement of cargo transported in vehicles with a GVWR greater than 10,001 pounds but substantially less than 26,001 pounds, the weight typically associated with a heavy vehicle. UPS does not believe that FMCSA has investigated the mechanical differences between such vehicles and heavy trucks, and argues that the agency has made no effort to determine the propriety of applying performance criteria and other standards developed for flatbed and other heavy trucks to UPS package cars, trailers, or other similar vehicles designed for the

handling of smaller package-type cargo within completely contained CMVs.

The Manufactured Housing Institute (MHI) expressed concern about whether the rules would be applicable to the transportation of manufactured homes. MHI stated that various types of materials and supplies are shipped within the transportable sections of manufactured homes from the point of manufacture to the retailer and/or home site, where installation crews set up the homes. The materials and supplies are used to complete the home and include carpeting, vinyl siding, roofing materials, and interior wall and ceiling materials. MHI also stated that the materials and supplies are spread out over several rooms, and often placed within closets, utility rooms, and/or other confined spaces within each transportable section of manufactured housing. MHI requested that manufactured homes be excluded from the applicability of the cargo securement rules.

FMCSA Response

The FMCSA believes the applicability of the new cargo securement rules should be consistent with the applicability of the current cargo securement regulations. The agency's cargo securement rules have historically been applicable to the full range of cargo-carrying commercial vehicles subject to the FMCSRs since the safety regulations were first issued more than 60 years ago. The new rules should also be applicable to all cargo-carrying, commercial motor vehicles (as defined in 49 CFR 390.5). None of the commenters have presented information to support making a distinction between the general applicability of the FMCSRs, and the applicability of the cargo securement rules. There is no readily apparent reason why any particular class or category of cargo-carrying vehicle subject to the FMCSRs, should be excepted from basic requirements to ensure that the cargo is secured to prevent it from falling from the vehicle, or shifting to the extent that the vehicle's stability or maneuverability is adversely affected.

We agree with commenters' assertions that there are differences in frame structure, platform height, axle placements and towing methods. However, there is no data to suggest that differences in the design of the commercial motor vehicle, or the manner in which it is towed (*e.g.*, a fifth wheel coupling device for truck trailers, versus a ball-and-socket arrangement for small trailers) negate the need for ensuring that cargo is properly secured to prevent accidents. The agency does not believe that the rules being adopted represent a one-size-fits-all approach to ensuring safety. The rules are performance-based to the greatest extent practicable resulting in requirements that increase with the size of the articles of cargo, or the complexity of the load securement system necessary to ensure that the articles are properly secured.

With regard to MHI's concerns about the rules being applicable to manufactured homes, transporters of the homes would comply by ensuring that materials and supplies used to complete the home, are positioned so that they cannot shift around inside the home while it is being towed to its installation site. Placing the items within closets and utility rooms or other confined spaces generally would satisfy the new requirements under § 393.102.

Relationship Between FMCSA's and RSPA's Cargo Securement Rules

The Georgia Public Service Commission (Georgia PSC) recommended that FMCSA should reference provisions of the Research and Special Programs Administration's (RSPA) load securement rules for hazardous materials transported by highway [Subpart B of 49 CFR part 177]. Georgia PSC indicated that the hazardous materials regulations do not contain load securement requirements for Class 9 materials and combustible liquids. These materials may be transported in non-specification packaging (*i.e.*, packaging that is not required to meet RSPA performance standards). In addition, the transportation of limited quantities is not specifically covered by load securement provision of the hazardous materials regulations.

FMCSA Response

The FMCSA does not believe it is necessary to include a reference to the hazardous materials regulations. The cargo securement rules being adopted are applicable to any articles of cargo being transported in or on a commercial motor vehicle, regardless of whether the transportation of the articles is subject to the hazardous materials regulations. The agency has contacted RSPA to discuss this matter does not believe the hazardous materials rules prevent motor carriers from complying with the FMCSA's cargo securement rules, or vice versa. The FMCSA's and RSPA's rules are complementary and motor carriers transporting hazardous materials must ensure compliance with both agencies' rules, whenever applicable.

Performance Criteria for Cargo Securement Systems

International Paper Company was among the numerous commenters that expressed concerns about the proposed minimum performance criteria for cargo securement devices and systems. International does not believe the deceleration values can be achieved under actual test conditions with loaded vehicles. They believe the values were based on researchers' analysis rather than the results of actual vehicle tests. International believes that minimum performance criteria of 0.6g forward, 0.35g lateral and 0.25g rearward have been proven in real-world testing and should be adopted.

The American Trucking Associations, Inc. (ATA), however, believes the proposed performance criteria are appropriate. The ATA stated:

> For many years a 0.6g deceleration was the best that could be attained. However, today's truck tires and brakes are more capable than ever before. In discussions with tire, brake and vehicle manufacturers there was agreement that the g forces defined in the proposal are now achievable. While these forces will rarely reach the 0.8g forward, 0.5g rearward and 0.5g lateral values, they can be achieved and so should be expected under certain non-crash conditions. Therefore we accept the new values.

The Advocates for Highway and Auto Safety (Advocates) believes the performance criteria are inadequate. Advocates stated:

> These proposed limits accord with recognized commercial vehicle operating tolerances for deceleration and acceleration generally without a driver losing control of a truck and subsequently rolling over, yawing, or jackknifing. However, they do not entail a severe demand on cargo securement in severe maneuvers or in minor crashes involving forces exceeding these ceilings.
>
> The FMCSA states in this proposed rule that it will not adopt performance standards ensuring that cargo is retained on or in the commercial vehicle in collisions, rollovers, or trailer detachments. *Id.* It is noteworthy that, although the agency asserts that ''shifting or falling cargo is a contributing factor in less than one percent of the accidents self-reported by motor carriers,'' it only states without corroborating figures that ''there is no evidence that a significant number of secondary injuries or fatalities are caused by the impact of cargo thrown from a CMV as the result of an accident, as opposed to the impact of the CMV itself with the roadway, nearby objects or other vehicles.'' *Id.* At 79053, 79054. The FMCSA cannot fulfill its obligation to provide a documented administrative record in this rulemaking by making this kind of summary dismissal of the crash consequences of dislodged cargo. Many anecdotal reports, including newspaper accounts, of crashes involving deaths and injuries as a result of cargo detachment have been made over the

years which verify that some of these losses occurred from the separation of freight from commercial motor vehicles as the result of severe maneuvers resulting in a collision with other vehicles, impacts with fixed object hazards, or rollovers. Advocates continues to believe that the agency has an obligation to establish standards which ensure the crashworthiness of cargo securement methods in most collisions or rollovers.

FMCSA Response

The FMCSA believes the proposed performance criteria are appropriate for adoption in the final rule. The agency agrees with the ATA that commercial motor vehicles are now capable of achieving the types of accelerations and decelerations that are being adopted as performance criteria. While it is true that not every commercial motor vehicle on the road today is capable of achieving such levels of performance, there is no practical way to ensure that all loads are adequately secured unless the rule includes performance criteria that reflect the latest developments in vehicle design. Neither motor carriers nor enforcement officials will be able to determine vehicle performance capabilities. Therefore, rather than adopt a rule with multiple sets of performance standards to cover a variety of vehicle types and configurations, the agency is adopting a single set of performance standards that would ensure that all loads are properly secured, regardless of the stopping capability or maneuverability of the vehicle.

The FMCSA disagrees with the Advocates' argument about the need for ensuring crashworthiness of cargo securement systems. FMCSA finds that there is no evidence that a significant number of secondary injuries or fatalities are caused by cargo thrown from a CMV after a collision. We recognize that there are anecdotal reports and newspaper accounts of crashes involving deaths and injuries as a result of cargo separating from a commercial motor vehicle after a collision with fixed objects or rollovers. However, a rulemaking to establish crashworthiness standards requires much more justification than anecdotal reports and newspaper articles.

The agency would have to identify the types of collisions or rollovers the rulemaking would address, the forces most likely to act on the articles of cargo during these collisions and rollovers, and the type of cargo securement systems necessary to prevent the cargo from separating from the vehicle. The effort required to undertake such a rulemaking would be costly and require a substantial amount of time to complete crash testing necessary to demonstrate the adequacy of the securement systems for the various scenarios. To undertake such a program with nothing more than anecdotal information as the justification would be inappropriate.

We continue to believe that there is no practical way to ensure that all loads are secured to prevent separation from the vehicle after there is a collision or rollover. The more practical approach for ensuring highway safety is to focus on crash avoidance-type cargo securement rules, rather than crashworthiness cargo securement standards.

Securement of Articles of Cargo in Van-Type Trailers

Numerous commenters expressed concerns about the applicability of the proposed rules to articles of cargo transported in van-type trailers. The American Forest and Paper Association stated:

The [preamble to the NPRM] states, ''* * *. In the case of van type trailers, the problem is that some motor carriers do not use any securement devices to prevent loads from shifting.'' We believe that this is a factual statement, however, it can be misleading. There are many loads that can be safely transported in a van type vehicle, using correct loading patterns, that require no additional forms of securement that meet the G-force requirements, excepting the rearward requirement which is overly restrictive. The loads that can be loaded, such that they prevent movement to the extent that affects the vehicle's stability and will not fall off of or out of the vehicle, are safe.

Weyerhaeuser stated:

[T]he sections of the proposed standard that cover general cargo (§ 393.100 through 393.120) are confusing and far removed from the principles of the Model Regulation. These sections appear to require tiedowns for cargo transported in sided vehicles at all times. Cargo that will not fall from or out of a vehicle and cargo that will not shift to the extent that the vehicle's stability is adversely affected should not be subject to the requirements concerning tiedowns or other additional securement. The confusion in these proposed rules could lead to needless litigation based on the confusion and misinterpretation of the rules by shippers, carriers and enforcement agencies.

FMCSA Response

The FMCSA agrees with commenters that there are many loads that can be safely transported in a van type vehicle, using correct loading patterns, without any additional forms of securement. The agency never intended that the cargo securement rules require tiedowns on all articles of cargo transported in van-type trailers, regardless of the type of cargo and loading arrangement. We have made revisions to the proposed language in response to the commenters to improve the clarity of the rule, and to make the final rule more consistent with the model regulations. The new regulatory language in § 393.106 will ensure a performance-based approach to securing articles of cargo in van-type trailers.

Making a Distinction Between Direct and Indirect Tiedowns

Many of commenters indicated that the proposed distinction between direct and indirect tiedowns would cause confusion if adopted in the final rule. The Commercial Vehicle Safety Alliance stated:

It is evident to the [CVSA] that, while there is a sound technical basis for drawing the distinction, there are grave concerns with [the] prospect of introducing this concept in regulation. There is a great deal of confusion with the distinction, in spite of the definitions included in the NPRM. Of particular concern is the prospect of ensuring that the calculation of aggregate working load limit of securement systems is carried out easily and consistently by carriers and enforcement officials.

Advocates stated:

[We] cannot conclusively distinguish between direct and indirect tiedowns, nor between exactly which parts of a direct tiedown are governed by one-half its working load or by its full working load. Although we can envision an indirect tiedown whose character appears to apply essentially constraining vertical forces on a piece of cargo against the floor of the vehicle, it is far less clear when a tiedown can or cannot be regarded as a ''direct'' tiedown or which parts are governed by full working load limits and which by one-half working load limits. Advocates is convinced that many carriers and drivers will fail to understand the distinctions drawn by the agency concerning tiedowns and will inappropriately judge a tiedown as ''direct'' when in fact it is an indirect tiedown, or will misjudge the working load limits applying to the different parts of a direct tiedown, resulting in securement which does not meet the standard and poses an unacceptable safety risk of dislodgement. As a result, the calculations which the agency wants carriers to apply in judging whether the requirements of the proposed regulation have been met, will be uncertain and often mistaken. The FMCSA needs to evaluate its descriptions of the different species of tiedowns and perhaps provide clearer text accompanied by illustrative examples of the most common ways in which tiedowns are direct and indirect, and provide guidance on how carriers and drivers can distinguish between the different parts of direct tiedowns with respect to working load limits.

FMCSA Response

The FMCSA agrees with the commenters concerns about making the

distinction between direct and indirect tiedowns. While there may be safety benefits to adopting a final rule that makes such a distinction, there are also safety risks associated with motor carriers, drivers, and enforcement officials not fully understanding the difference between the two types of tiedowns, and underestimating the aggregate working load limit necessary to prevent the shifting or falling of cargo. The current requirement that the aggregate working load limit of any securement systems used to restrain an article or group of articles be at least one-half times the weight of the article will remain in place. However, the new rule explains in greater detail how the working load limits of the individual tiedown devices are added together to determine the aggregate working load limit, and to account for each associated connector or attachment mechanism, and for each section of a tiedown that is attached to an anchor point.

Marking and Rating of Tiedowns and Anchor Points

Mr. John R. Billing, one of the members of the group that drafted the model regulations, commented on the agency's decision not to prohibit the use of unmarked tiedowns at this time. Mr. Billing stated:

> One of the objectives of the standard is to ensure that shippers, carriers and drivers use the proper tools and techniques to secure cargo. When it comes to heavy specialized loads, like logs, metal coils, billets or plate, concrete pipe, and others, there should be no room for doubt about the capacity of the tools or the reliability of the techniques. Most carriers who move such commodities on a daily basis [use] marked tiedowns and trailers designed for the loads they carry. Prohibiting use of unmarked tiedowns will not affect them. It will affect the driver who tries to take such a load, and has neither the experience nor the proper equipment. An objective of the standard is to try to prevent the inexperienced and under-equipped from doing things they should not be attempting.

On the subject of trailer anchor points, Mr. Billing stated:

> This issue is really the same issue as allowing use of unmarked chain. If a trailer will carry a serious load, secured by marked chain of serious capacity, then the anchor points need to be strong enough to resist the loads that the chain will apply to them.

The ATA indicated that it agrees with the concept of having unmarked tiedowns considered as having a working load limit equal to the lowest rating for their type of material, as listed in the table of working load limits included in the rule. The ATA stated:

> Ultimately, when all manufacturers mark their products with their working load limit it will be possible to prohibit unmarked tiedown devices. The possibility of doing this will arise several years after the proposed rule goes into effect and manufacturers and consumers realize the benefits of making and using marked products.

Keen Transport, Inc. expressed concern about the potential impact the rules would have on motor carriers if FMCSA prohibited the use of unmarked tiedowns and required rating and marking of anchor points on CMVs.

FMCSA Response

We agree with the principle that it is important to ensure that shippers, carriers and drivers use the proper tools and techniques to secure cargo. However, safety-conscious motor carriers and drivers could achieve compliance with the rules being adopted, and make wise choices about cargo securement devices, without the mandatory marking and labeling of tiedowns and anchor points.

We acknowledge that if unmarked tiedowns of varying grades are readily available, motor carriers could unknowingly violate the current rule and the new rule by failing to have an adequate number of securement devices. The consequences for a load such as metal coils could be fatal to other motorists. While the risks of such an accident could be greatly minimized by prohibiting motor carriers from using unmarked tiedowns, there is insufficient information to support such a requirement at this time.

We continue to believe that before initiating a rulemaking to prohibit the use of unmarked/unrated cargo securement devices, we would have to quantify the potential economic burden on the motor carrier industry and those involved with the manufacture, sale, and distribution of unmarked securement devices. Since we have no reliable information on the number of manufacturers, distributors, and retailers of unmarked tiedowns, the quality or strength of such devices, or the amount of these tiedowns currently in use by motor carriers and in retailers' stock, it would be inappropriate to propose a prohibition at this time. None of the commenters favoring a prohibition on unmarked tiedowns provided information to support the need for such a rulemaking.

With regard to the specific issue of anchor points on semitrailers and trailers, we continue to believe that it is not appropriate to establish such requirements at this time. Although the Truck Trailer Manufacturers Association (TTMA) has established a recommended practice, ''RP 47–99, Testing, Rating, and Labeling Platform and Van Trailers for Cargo Securement Capability'' June 1, 1999, concerning test procedures and general performance specifications for tiedown anchor points, front-end structures, and sidewall structures, the FMCSA still does not have any information on the extent to which trailer manufacturers follow these recommendations. If we determine that a significant percentage of manufacturers follow the recommended practices, the agency will consider a rulemaking to incorporate by reference the TTMA's recommended practice. The requirement would then apply to trailers manufactured on or after the effective date of the final rule. We are taking this cautious approach because we must be certain that newly manufactured trailers satisfy the guidelines in the recommended practice and that motor carriers would not be prohibited from using suitable semitrailers and trailers solely on the basis that the vehicle lacked a rating and marking of the anchor points.

Based on the anecdotal information available to date, the vast majority of cargo-securement related accidents do not involve problems with the anchor points. The majority of these accidents appear to involve an inadequate number of tiedown devices, improper placement of the tiedowns, or other factors unrelated to the design or performance capability of the anchor points. Therefore, we continue to believe that our focus should remain on the actual tiedowns and the way motor carriers use such devices to secure articles of cargo, rather than on vehicle-based anchor points.

Responsibilities for Securement of the Contents of Intermodal Containers

A number of commenters discussed the difficulties that motor carriers would have if the cargo securement rules required the motor carrier to ensure that the contents of the intermodal container were properly secured, regardless of the entity that loaded the container. The ATA stated:

> It is illegal for a motor carrier or driver to tamper with a seal on an intermodal cargo container that has not been cleared by the United States Customs [Service]. Many motor carriers are Customs bonded to receive containers of cargo that have not yet been approved by agents of the U.S. Customs [Service]. Customs-bonded motor carriers are responsible for:
>
> • Affixing the red Customs warning cards at the access points of conveyances (typically vehicle, including intermodal container, doors) (the red cards are in addition to the existing seal(s)); and
>
> • Assuring the integrity of the seal and the ''sanitary'' condition of the cargo until

Customs clears its status for delivery to the consignee.

It is not uncommon for intermodal containers of Customs bonded cargo to either travel hundreds of miles or be stored in the motor carrier's secured facilities before being cleared by Customs. During this period, any removal or tampering with the seal(s) or cards violates U.S. Customs regulations and is punishable by two years imprisonment and/or a $5,000 fine. Customs regulations do not permit breaking seals to double-check the loading party's work. The only regulatory exception is in the case of ''* * * a real emergency.''

The United States Maritime Alliance Limited and the Carriers Container Council, Inc. jointly submitted comments. They stated:

While the proposed regulations recognize that commercial motor vehicle (''CMV'') drivers do not have the ability to inspect sealed containers, it fails to recognize that similarly ocean carriers and marine terminal operators are not able to inspect cargo transported in sealed containers. This is a significant omission because it indicates that the drafters are not considering a global view of intermodal transportation but instead are taking a narrow view of the system. Moreover, the exemption for CMV drivers provided under § 392.9(b)(4) could be viewed as placing a burden on ocean carriers or marine terminal operators to perform these inspections prior to tendering the container to a motor carrier. The proposed regulations are deficient in providing the same type of unequivocal exemption for ocean carriers and marine terminal operators.

Advocates believes it is inappropriate to exempt drivers from inspecting the cargo securement of freight carried in sealed containers, freight which the driver is not allowed to inspect, or freight ''loaded in a manner that makes inspection of the cargo impracticable.'' 65 FR 79055. Advocates stated:

These exemptions will easily become major loopholes for consignors, brokers, freight forwarders, and motor carriers which will undoubtedly be exploited especially for legal defense of suits resulting from crashes with deaths, injuries, and property damage losses as the direct result of dislodged cargo. The provision provides ample opportunities for the different parties in the supply chain to attempt to shift burdens of responsibility for cargo securement and any subsequent failures.

FMCSA Response

The FMCSA recognizes the concerns commenters have about the inspection of cargo in intermodal containers. However, the new cargo securement rules would place no greater responsibility on motor carriers and drivers than the current rules. Neither the current rules nor the rules being adopted today include a requirement that drivers inspect all loads in intermodal containers. Drivers are only required to inspect loads when practicable. If the driver has the opportunity to check the securement of the load (for example, the driver is present while the container is being loaded) then there is no readily apparent reason why the motor carrier and driver should not be held accountable for the securement of the load. On the other hand, if there was no practicable opportunity to inspect the cargo securement system because the container was sealed by the shipper with strict instructions to the carrier not to open the container, then the exception under § 392.9(b)(4) would be applicable, and the driver would not be required to inspect the cargo securement system.

The FMCSA encourages U.S-based motor carriers to work with domestic and international shippers to ensure that loads are properly secured. Regardless of whether the FMCSRs are applicable to shippers, they have a role in ensuring highway safety when they load containers for transport on the highway, and seal the containers, for whatever reason.

Periodic Inspection of Cargo Securement Systems by Driver

The California Trucking Association (CTA) recommends that the requirement for drivers to stop and inspect the articles of cargo and the securement devices be revised to be product-specific. The CTA believes that each motor carrier should develop a policy to govern load securement and inspection procedures based on their knowledge and expertise in transporting various commodities. The written policy would then be made available to enforcement personnel during a compliance review.

The Maryland Department of Transportation (MDOT) opposed increasing the mileage at which a driver must inspect the load after beginning a trip from 25 miles to 50 miles. MDOT indicated that there have been a number of incidents where the load came loose and caused traffic tie-ups and in some cases collisions which have resulted in serious injury or death.

Mr. Gary Volkman disagreed with the requirement for en route inspections of the cargo securement system. Mr. Volkman stated:

Consider that currently the hazardous materials regulations already have a rule that every 2 hours or 100 miles the driver of a placarded load must stop and do a tire check. Why would we confuse the issues in a different regulation that will require the driver to stop in the first 50 miles and conduct a tie down inspection? As a dry van carrier it is entirely feasible that we may have a situation wherein we provide transportation for a partial load of metal coils (eye vertical) and hazardous materials that require placards. Which rule should we follow? Or, would we stop every 50 miles for the entire trip?

FMCSA Response

The FMCSA disagrees with the commenters' views about the periodic inspection of the cargo securement system. We continue to believe that it is necessary for drivers to inspect cargo securement systems because the amount of tension in the tiedowns assemblies may decrease significantly after the driver begins operating the vehicle. Vibrations may cause the articles of cargo to shift slightly such that the tiedowns need to be readjusted to ensure that the articles do not fall from the vehicle, or shift to the extent that the vehicle's stability is adversely affected. We do not have sufficient information to develop a periodic inspection standard that is commodity-specific as one commenter suggested, but there is sufficient basis for retaining a general rule for all drivers to periodically check the condition of the cargo securement system.

With regard to comments about the frequency of periodic inspections, we recognize the differences between the minimum requirements for checking the condition of the cargo securement system, and checking the tires in accordance with § 397.17. The differences, however, do not prevent drivers and motor carriers from complying with either the cargo securement rules, or the tire inspection rule.

On July 16, 2002 (67 FR 46624), the agency proposed eliminating the requirement for periodic tire checks. The agency proposed that tires be checked at the beginning of each trip and each time the vehicle is parked. If the proposal is adopted as a final rule, the differences between the inspection intervals would be a moot issue.

With regard to checking the cargo securement system, we are providing drivers with three options: whenever the driver makes a change in the duty status; or after the vehicle has been driven for 3 hours; or after the vehicle has been driven for 150 miles, whichever occurs first. Pending the completion of the rulemaking cited above, § 397.17 currently requires drivers of motor vehicles transporting hazardous material, and equipped with dual tires on any axle, to stop the vehicle at least once every 2 hours or 100 miles of travel, whichever occurs first, to inspect the tires. It is clear that § 397.17 requires more frequent stops to ensure the proper operating condition of

the tires. It is also clear that stopping more frequently than the intervals prescribed by § 392.9 is not prohibited. Therefore, for drivers transporting hazardous materials, compliance with §§ 392.9 and 397.17 could be achieved by simply following the intervals specified in § 397.17. We do not believe it is necessary that both rules use the same intervals.

In response to MDOT, the proposal to change the initial en route inspection from 25 miles to 50 miles is based on the model regulation developed by the harmonization committee and discussed in the public meetings described above. Given the extensive knowledge and experience of the government and industry representatives, we believe it is appropriate to adopt the 50-mile criterion. In doing so, we are allowing drivers the flexibility to perform the initial en route inspection within the first 25 miles after beginning a trip, or if the driver believes it is more appropriate based on the nature of the articles of cargo and the condition of the roads, to inspect the cargo within the first 50 miles after beginning a trip. We are not aware of any data or information that would suggest that allowing up to 25 additional miles for the first en route inspection would reduce the level of safety of operation of commercial motor vehicles.

Special Rule for Special Purpose Vehicles

Silk Road Transport indicated that the current cargo securement rules provide an option for achieving proper securement by means other than those specified in the rules. Silk Road Transport believes proposed rules should be revised to include the same level of flexibility for unique cargo such as railcars, airplane wings, and other unique cargo.

FMCSA Response

We agree with Silk Road Transport's comments. The final rule retains what is currently codified under § 393.100(d), the special rule for special-purpose vehicles, in § 393.110(e).

We have always understood that there are articles of cargo that require special means of loading onto commercial motor vehicles and recognized that the general cargo securement rules may not be appropriate when applied to the securement systems used for these articles. In many cases, if the general rules are applied to these loads, the articles of cargo may be damaged during transport to the extent that they could no longer be used for their intended purposes. Motor carriers are capable of ensuring that specialty articles, such as those described by Silk Road Transport, are adequately secured in a manner consistent with the performance requirements of this rule, without being subjected to detailed rules that could result in damage to the cargo. The rules have allowed motor carriers flexibility for special-purpose vehicles for many years and there is no readily apparent reason to believe that the safety of operation of commercial motor vehicles would be reduced if we continue to allow the flexibility for special-purpose vehicles.

National Association of Chain Manufacturers' (NACM) Publication

The ATA believes the NACM is inconsistent in its use of safety factors. The ATA indicated that grade 4 chain has a safety factor of 3 (the ratio of the breaking strength to the working load limit is 3) but grades 7, 8, and 10 have a safety factor of 4. The ATA stated:

> Past regulatory practice and industry experience show that, employed in conjunction with the stipulations in the FMCSRs, a safety factor of 3 is appropriate for chain that is used to secure cargo. Currently Grade 4 chain and webbing both use a safety factor of 3. So, the assumption made to ensure that changing from a rule based on static breaking strength to one based on working load limit would not require more tie-downs, succeeded for them. However, as noted, NACM assigns chain grades 7, 8, and 10 a safety factor of 4. Hence these products are now penalized in that they can not be employed as they were prior to 1993, when all chain used for load securement was selected on the basis of its static breaking strength.

The ATA recommends that all load securement chain be assigned a safety factor of three.

The ATA believes this would keep the rule from being overly conservative and avoid penalizing motor carriers for using a superior product.

The Specialized Carriers and Rigging Association (SC&RA) also expressed concerns about the NACM's safety factors. SC&RA indicated that it joined the ATA in requesting the NACM change to a cargo securement safety factor of 3, but the NACM rejected the request for fear of confusion caused by having one safety factor for loading and another for lifting.

FMCSA Response

The FMCSA appreciates the concerns commenters expressed about NACM's safety factors for determining working load limits for various grades of chain. However, the agency does not believe this rulemaking is the forum for resolving the issue.

The agency first adopted the use of working load limits on July 6, 1994 (59 FR 34712). The final rule incorporated by reference the NACM's specifications. There appeared to be support for relying on the NACM's expertise in establishing minimum working load limits for chain that meets the association's manufacturing specifications. There is no indication from the commenters that the technical expertise represented by the association's publication is any less credible than it was in 1994.

We believe it is appropriate to defer judgment about working load limits for chains to reputable chain manufacturers and their association. While the NACM's rationale for using different safety factors for different grades of chain is not entirely clear, the level of knowledge and expertise represented by the association is such that the agency would rather adopt their working load limits, even if they may appear to be overly conservative. There is no indication that adopting the NACM's most recent working load limits would have an adverse impact on safety, or result in unnecessarily burdensome requirements when incorporated by reference.

The agency encourages all interested parties to continue dialogue with the NACM to achieve a common understanding of the working load limits necessary for ensuring highway safety. If the dialogue results in the NACM revising its safety factors, the FMCSA will consider incorporating by reference the new NACM publication.

Logs

Several commenters specializing in the transportation of logs expressed concern that the proposed applicability statement for the rules concerning the securement of logs was inconsistent with the model regulations. The commenters also identified regulatory language in the applicability paragraph that was no longer necessary if the agency made the requirements more consistent with the model regulation. Specifically, the commenters indicated that the applicability paragraph in the model regulations included an exception for logs that are unitized by banding or other comparable means. However, the agency's proposal would have imposed the requirements on banded loads rather than to allow them to be transported under the general rules for securement.

The commenters indicated that the statement about the rules applying to ''all other logs'' and the sentence explaining that a load comprised of shortwood and longwood must be treated as shortwood were unnecessary.

FMCSA Response

The FMCSA agrees with the commenters. After carefully reviewing the model regulations, the agency recognizes the inconsistency between its NPRM and the model standards. The regulatory language for the final rule has been revised accordingly.

Concrete Pipe

The SC&RA and the American Concrete Pipe Association (ACPA) expressed concern about the proposed requirement that two longitudinal cables (running from the front of the trailer to the rear of the trailer) be used on certain loads of concrete pipe. The SCRA stated:

> Current practices within the industry have proven to be safe and effective for the last 45 years. These practices typically include a single 2 speed winch mounted to a heavy duty stand in the front of the trailer. On the winch a [½-inch] cable goes over the load and attaches to the bed of the rear of the trailer. After the cable is in place over the load and tightened, the low gear side of the winch is engaged. This process not only forces downward pressure on the bed but it also forces the pipe together. The end result is a tighter bundle of product on the trailer bed. This method has been demonstrated to the enforcement community and has been deemed to be a safe and practical means of transporting pipe. SC&RA proposes flexibility in this area that would either require two [⅜-inch] cables or a single [½-inch] cable with a [two-speed] winch mount.

FMCSA Response

We agree with the comments from ACPA and SC& RA. The most important aspect of the requirement for the longitudinal tiedown is the working load limit. Either one ½-inch, or two ⅜-inch cables or chains with the appropriate working load limit(s) would ensure safety. We believe it is possible to allow flexibility without reducing safety so the final rule provides increased flexibility for longitudinal tiedowns.

Flattened Cars

The Institute of Scrap Recycling Industries, Inc. (ISRI) expressed concern about the proposed requirements for securing flattened cars. ISRI stated:

> Companies that process and load flattened and crushed cars for transport to recycling facilities must follow stringent practices to prevent loose material from falling from these loads. There are several different ways by which junked cars are flattened or crushed. Each of these practices includes processing controls and numerous inspections of the car to detect and remove loose material that could fall from the load during transport. A secured load of property processed and loaded flattened or crushed cars can be visually inspected by any law enforcement officer or transportation official to ascertain that the load will not shed loose material onto the roadway during transport.

Hugo Neu Corporation submitted comments in opposition to those of ISRI. Hugo Neu stated:

> We are aware of the fact that a trade association of which we are a member, ISRI, along with the Steel Manufacturers Association (SMA), has commented on the proposed rules and prepared a presentation which purports to demonstrate that the proposed containment barriers are not needed to prevent the shifting and falling of cargo as it relates to flattened cars. Those comments are directed at attempting to mitigate the proposed standards requiring either four or three-sided trailers for transport of flattened cars with other containment requirements. ISRI and SMA have taken the position that these cars can be safety transported on a flatbed without walls. We strongly disagree.

FMCSA Response

The FMCSA recognizes the concerns expressed by ISRI and the Steel Manufacturers Association. However, we believe the proposed rules concerning the securement of flattened cars should be adopted without change. While the specific practices for flattening cars ISRI mentioned may greatly reduce the likelihood that loose pieces will fall from the commercial motor vehicle transporting the flattened cars, we are not convinced that the flattening process alone would ensure transportation safety.

This subject was debated extensively during the public meetings concerning the development of the model regulations. None of the information presented by ISRI or the transporters of flattened cars during those public meetings was convincing to the Federal, State and Provincial government representatives present, or the other industry groups represented. Consequently the model regulations included the language that FMCSA proposed.

We continue to doubt that the degree to which cars are compressed ensures that none of the components will fall from the cars. The cars are compressed to a fraction of their original height to make it easier to transport them to recycling facilities. Most of the parts would be pressed together but some items such as door handles and mirrors may remain loosely attached to the vehicle. We believe that having loose parts is inevitable given that the process of compressing the car will undoubtedly do more damage to the car than the events that resulted in the car being turned over for recycling.

A visual inspection, even by drivers or enforcement personnel, is not sufficient for making a determination whether portions of the load will vibrate or shake loose while the vehicle is traveling on public roads. Flattened cars are usually transported on flatbed trailers, and stacked in such a manner that neither a driver nor an inspector could determine with any degree of certainty whether there are loose items without climbing the stack of flattened cars to physically examine the load. We believe such an exercise would not effectively ensure safety because of the potential that a loose component could be missed during the inspection, and because of the risks to drivers and enforcement personnel associated with climbing stacks of flattened cars.

There is a need for practical requirements for ensuring that commercial motor vehicles are properly equipped to prevent loose items that separate from the flattened car during transport from falling onto the roadway, without relying on risky inspection procedures for drivers or enforcement personnel. The rules being adopted today provide practical standards that would ensure that loose components on the flattened cars do not fall from the transport vehicle.

Visibility Requirements for Drivers of Self-Steer Dollies

The ATA requested that § 392.9(a)(3) include an exception for drivers of self-steer dollies. These dollies are typically a set of axles at the rear of a very long load. The cargo being transported between the truck tractor (or towing unit) and the dolly obscures the dolly driver's view because the driver is positioned under the load. The ATA argues that because the driver seated in the dolly is in contact with the driver in the truck tractor, the safety of the operation is not compromised by the fact that the load obscures the view of the dolly operator.

FMCSA Response

FMCSA agrees with the ATA recommendation. Although it is important for CMV drivers to be capable of seeing other vehicles in the vicinity of the CMV, the agency does not believe safety would be adversely affected by cargo obscuring the dolly driver's view directly in front of him or her. Since the driver with primary control for the operation of the combination vehicle is in the truck tractor, and the driver in the truck tractor and dolly are able to communicate, there is no reason to be that safety would compromised. This is especially the case given that the commercial vehicle would most likely have escort vehicles.

Discussion of the Final Rule

The rules being adopted are based on the North American Cargo Securement Standard Model Regulations. The agency is replacing its current cargo securement-related regulations under § 392.9, concerning driver inspection of cargo and cargo securement systems, and §§ 393.100 through 393.106 concerning cargo securement methods.

The agency is also amending § 393.5 to adopt definitions of aggregate working load limit; anchor point; article of cargo; bell pipe concrete; blocking; bracing; frame vehicle; friction mat; hook-lift container; integral securement system; longwood; rail vehicle; shortwood; sided vehicle; tiedown; tractor-pole trailer; void filler; well; and working load limit. The agency is adopting these definitions to ensure a common understanding of the terminology used in the regulations. The definitions are based on those in the model regulations.

The FMCSA notes that there are numerous other definitions in the model regulations. However, the agency continues to believe that it is not necessary to adopt many of those definitions because the terms are already defined in the FMCSRs, even though with slightly different wording.

Inspection of Cargo and Securement Devices

The FMCSA is revising § 392.9 to require that drivers inspect the cargo and the securement devices within the first 50 miles (80.4 kilometers). Currently, § 392.9 requires inspection within the first 25 miles (40.2 kilometers). The FMCSA continues to believe that the research concerning the effects of vibration on cargo securement devices and changes in the tension of indirect tiedowns, suggests 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, rather than 0 to 25 miles. This is because traveling beyond 25 miles would subject the vehicle to more vibration and forces over a longer period of time. However, the agency believes the maximum distance the vehicle could be operated safely prior to the inspection of the tiedowns should not exceed 50 miles. All other requirements currently contained in § 392.9 would remain the same.

Applicability of the Final Rule

Section 393.100 establishes the applicability of the cargo securement rules under subpart I of part 393. The applicability of the final rule is the same as the existing rule, covering all cargo-carrying commercial motor vehicles (as defined in 49 CFR 390.5) operated in interstate commerce.

Performance Criteria

The agency is adopting new performance requirements concerning the longitudinal, lateral, and vertical accelerations that cargo securement systems must withstand to satisfy the rules. Acceleration is the rate at which the speed or velocity of an object increases and deceleration is the rate at which the velocity decreases. Accelerations are commonly reported as a proportion of the acceleration due to gravity (g). This acceleration is 9.81 meters/second/second (32.3 feet/second/second), which means that the velocity of an object dropped from a high elevation increases by 9.81 meters/second (32.3 feet/second). The FMCSA requires that cargo securement systems be capable of withstanding the following three forces, applied separately:

(1) 0.8 g deceleration in the forward direction;

(2) 0.5 g acceleration in the rearward direction; and

(3) 0.5 g acceleration in a lateral direction.

The values chosen are based on the researchers' analysis of previous studies concerning commercial motor vehicle performance. The analysis indicated that the highest deceleration likely for an empty or lightly loaded vehicle with an antilock brake system, all brakes properly adjusted, and warmed to provide optimal braking performance, is in the range of 0.8–0.85 g. However, a typical loaded vehicle would not be expected to achieve a deceleration greater than 0.6 g on a dry road.

The typical lateral acceleration while driving a curve or ramp at the posted advisory speed is in the range 0.05–0.17 g. Loaded vehicles with a high center of gravity roll over at a lateral acceleration above 0.35 g. Lightly loaded vehicles, or heavily loaded vehicles with a lower center of gravity, may withstand lateral acceleration forces greater than 0.50 g. We continue to believe that the information presented by the researchers supports the use of the decelerations listed above.

Generally, motor carriers are not required to conduct testing of cargo securement systems to determine compliance with the performance requirement. Section 393.102 explicitly states that cargo that is immobilized or secured in accordance with general rules regarding cargo securement systems, or the commodity-specific rules, are considered to meet the performance criteria.

Safe and Proper Working Condition for Tiedowns

The final rule includes a requirement that all vehicle structures, 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 that could adversely effect their performance. This requirement differs from the proposed rule in that the defect or deficiency must be capable of having an adverse effect on the performance of the cargo securement system before the prohibition would apply. The proposal would have prohibited the use of cargo securement devices with any visible damage, including but not limited to, cracks, cuts and deformation, regardless of whether there was any reason to believe there would be a safety problem. We carefully considered the numerous comments on the proposed language, and have made appropriate revision to the rule.

Standards for Tiedowns

The current FMCSRs incorporate by reference manufacturing standards for certain types of tiedowns including steel strapping, chain, synthetic webbing, wire rope, and cordage. The FMCSA is updating its reference to the National Association of Chain Manufacturers' (NACM) Welded Steel Chain Specifications, June 15, 1990, edition to incorporate by reference the November 15, 1999, version. The agency notes that some of the working load limit values in the 1999 version differ slightly from those in the 1990 version. Also, the 1999 version includes working load limits for a new grade of alloy chain, grade 100.

The agency is also changing its reference for synthetic webbing from the 1991 edition to the 1998 edition of the Web Sling and Tiedown Association's publication. Generally, the working load limits are the same as those in the 1991 publication.

Combining Requirements for Load Binders, Attachment Points and Winches

The agency had proposed that §§ 393.112, 393.114, and 393.116 provide requirements for load binders and associated hardware, attachment points on commercial motor vehicles for tiedowns, and winches of fastening devices, respectively. Upon careful review of the proposed requirements and in response to numerous comments about the apparent redundancy with the general requirements under

§§ 393.104(c), and 393.106(d), the final rule does not include the proposed wording that appeared in those sections. The remaining sections of the final rule have been renumbered accordingly.

Securement of Intermodal Containers and the Contents of Such Containers

The FMCSA is adopting commodity-specific requirements which would apply to intermodal cargo containers. The requirements being adopted today includes a provision allowing motor carriers the option of attaching tiedowns to the upper corners of loaded containers. The proposal would have required that all tiedowns be attached to the lower corners of the loaded containers. The agency agreed with commenters concerns about the need for flexibility in securing the containers.

The agency is including in the final rule a provision concerning the transportation of empty intermodal containers. Upon careful review of the model regulations and previously issued regulatory guidance, the agency determined that a less stringent provision concerning the securement of empty containers should be included. Empty intermodal containers have been transported safely on vehicles other than container chassis for many years. Frequently, the container(s) may overhand the front or rear of the trailer. However, as long the containers are properly secured, motor carriers have been allowed to transport them in this manner. Since the empty containers are a fraction of the weight of fully laden containers, the securement methods needed to ensure safety are not as extensive as with loaded containers. The new language concerning empty containers is provided in § 393.126(d).

The agency is also adopting specific rules for metal coils transported in intermodal cargo containers. The agency does not believe the rules will create difficulties for motor carriers or shippers offering loaded containers for transportation.

For example, § 392.9(a) requires drivers to assure themselves that cargo is properly distributed and adequately secured before operating a commercial motor vehicle. Section 392.9(b) requires drivers to examine the cargo and load-securing devices during the trip and make adjustments when necessary to maintain the security of the load. Section 392.9(b) provides an exception for driver's of sealed commercial motor vehicles who have been ordered not to open the vehicle to inspect its cargo, or to drivers of vehicles loaded in a manner that makes inspection of the cargo impracticable. The requirements of § 392.9 when combined with the explicit requirements concerning the securement of the contents inside intermodal containers would make it clear that each motor carrier and each driver must ensure that such loads are properly secured, when it is practicable to inspect the condition of loading.

Front End Structures on CMVs

Although the model regulations do not include a provision concerning front end structures (*i.e.*, headerboards) used as part of a cargo securement system, the FMCSA is retaining its current front-end structure rules for CMVs. The FMCSA is, however, revising its current rule (§ 393.106) by changing the applicability to cover CMVs transporting cargo that is in contact with the front-end structure of the vehicle. By contrast, the current rule establishes requirements for, and requires that vehicles be equipped with, front-end structures irrespective of whether the device is being used as part of a cargo securement system.

The current rules emphasize occupant protection rather than cargo securement. They assume that cargo that is not braced against a front-end structure could shift forward, and the structure would prevent the load from penetrating the driver's compartment. While this concept may have merit for certain types of cargo, we continue to believe that the best way to ensure driver safety is to have tougher standards to prevent the cargo from shifting forward. For example, if the vehicle is transporting metal coils, once the load begins to move forward, it is unlikely that a front-end structure would save the driver. However, by establishing new rules to better ensure that the coils do not move forward, we are more likely to accomplish the safety objective of saving lives and preventing injuries.

Specific Securement Requirements by Commodity Type

The FMCSA is adopting detailed requirements for the securement of the following commodities: logs; dressed lumber; metal coils; paper rolls; concrete pipe; intermodal containers; automobiles, light trucks and vans; heavy vehicles, equipment and machinery; flattened or crushed vehicles; roll-on/roll-off containers; and large boulders. During public meetings concerning the development of the model regulations, participants said that these commodities cause the most disagreement between industry and enforcement agencies as to what is required for proper securement.

The FMCSA notes that each of these commodities must be properly secured under the current performance-based cargo securement rules. However, with the exception of metal coils, there is no detailed guidance for motor carriers and enforcement officials. We continue to believe that accidents may be prevented through the establishment of much more detailed rules that clearly spell out what is required to achieve the desired level of safety. The rules would eliminate most of the confusion about what constitutes an acceptable cargo securement system.

The FMCSA notes that the requirements for the securement of concrete pipe being adopted today does not include the provision requiring that ice be removed from pipe before it is loaded. The agency no longer believes that provision is necessary because most shipments of concrete pipe would not be covered with ice, and in those cases where ice was present, there may be no practicable means of deicing the pipe prior to it being loaded onto a CMV. Most shippers of concrete pipe would ensure to the greatest extent practicable that the pipe is not covered with ice immediately prior to transport. For those cases in which exposure to ice could not be avoided, motor carriers are strongly encouraged to take appropriate actions to ensure that load is properly secured before transport. However, the agency does not believe it is necessary to make the mere presence of any amount of ice on a concrete pipe a violation of the FMCSRs.

Use of Unmarked Tiedowns

The final rule does not include a prohibition on the use of unmarked tiedown devices. Although many of the participants in the harmonization group meetings and numerous commenters to the NPRM argue that the Federal cargo securement rules should include such a prohibition, we do not believe it is appropriate to establish such a rule at this time.

Before establishing a prohibition on the use of unmarked tiedowns, the FMCSA would have to quantify the potential economic burden on the motor carrier industry and those involved with the manufacture, sale, and distribution of unmarked securement devices. Since the FMCSA has no reliable information on the number of manufacturers, distributors, and retailers of unmarked tiedowns, the quality or strength of such devices, or the amount of these tiedowns currently in use by motor carriers and in retailers' stock, it would be inappropriate to prohibit these devices. However, in view of the potential safety hazards of motor carriers misidentifying unmarked tiedowns, the final rule includes a provision that unmarked welded steel

chain be considered to have a working load limit equal to that of grade 30 proof coil, and other types of unmarked tiedowns be considered to have a working load limit equal to the lowest rating for that type in the table of working load limits.

Rating and Marking of Anchor Points

The final rule does not include a requirement that anchor points be rated and marked. While we continue to agree with the basic principle of rating and marking of anchor points, there is insufficient data to support establishing manufacturing standards at this time. As we indicated above, we will continue to work with the TTMA and other private sector groups to gather information about the extent to which trailer manufacturers follow the TTMA's recommended practice concerning rating and marking of anchor points. As we gather this information, we will consider the need for any future standards development work in this area.

Development of Training Program

The agencies and organizations participating in the North American Cargo Securement Program have established a Training and Education Committee responsible for developing a training package for motor carriers and enforcement officials to ensure that the model regulations now being considered for adoption throughout North America are understood by all affected parties. The training package will cover all of the requirements in the model regulations, and to some extent, best practices for securing cargo. The training materials may be used to help motor carriers better understand how to properly secure different types of cargo and to ensure they are aware of what is required. Enforcement officials could also use the training material to ensure that they have an understanding of the new requirements. It is anticipated that the training materials will be completed and available to the public from the FMCSA before the deadline for compliance with the final rule. The FMCSA will post publications on its website to assist individuals with Internet access. The FMCSA will also consider making copies of the training materials available through the U.S. Department of Commerce's National Technical Information Service.

Compliance Date

The FMCSA has chosen January 1, 2004, as the deadline for motor carriers to ensure compliance with the final rule. The FMCSA believes this time frame is appropriate and will provide motor carriers and enforcement officials sufficient time to prepare for the transition from the current requirements to rules compatible with the model regulations.

Rulemaking Analysis and Notices

Executive Order 12866 (Regulatory Planning and Review) and DOT Regulatory Policies and Procedures

The FMCSA has determined that this action is not a significant regulatory action within the meaning of Executive Order 12866 or within the meaning of Department of Transportation regulatory policies and procedures. Neither the level of public or Congressional interest, nor the costs of implementing the final rule are such that the rule would be considered significant. Based on the information currently available, the cost to the motor carrier industry for compliance with the rules, and the cost to the States for adopting and enforcing the new requirements will be significantly less than the $100,000,000 threshold used as one of the factors in determining the significance of a rulemaking.

This rule requires that motor carriers operating in interstate commerce comply with improved cargo securement regulations based on the following: (1) The results of a multi-year comprehensive research program to evaluate current U.S. and Canadian cargo securement regulations; (2) the motor carrier industry's best practices; and (3) recommendations presented during a series of public meetings. Generally, the revision requires motor carriers to change the way cargo securement devices are used to prevent certain articles from shifting on or within, or falling from, CMVs, and how calculations are done. In some instances, the changes require motor carriers to increase the number of tiedown devices used to secure certain types of cargoes.

The agency believes the vast majority of motor carriers have a sufficient supply of tiedown devices on board their vehicles at all times. The final rule allows motor carriers to continue using those tiedowns provided the devices meet the applicable manufacturing standards currently incorporated by reference in § 393.102(b).

Most of the costs associated with this rulemaking are believed to be associated with the training of drivers, motor carrier employees responsible for loading CMVs, and enforcement officials to ensure that they understand the requirements being adopted. However, this cost should be minimal because the commodity-specific rules have been drafted to enable the reader to use the rules as step-by-step instructions for securing the commodity being transported.

With regard to costs to the States to train inspectors, the agency is working with its State and Provincial partners to develop training materials that could be used to minimize the costs for the enforcement community and the motor carrier industry. For States participating in the Motor Carrier Safety Assistance Program (MCSAP), training costs are considered an eligible expense. This means the States could receive Federal funds to help cover the costs of training their roadside inspectors. Therefore, based upon the information above, the agency estimates that the economic impact associated with this rulemaking action would be minimal and a full regulatory evaluation is not necessary.

Regulatory Flexibility Act

In compliance with the Regulatory Flexibility Act (5 U.S.C. 601–612), the FMCSA has considered the effects of this regulatory action on small entities and determined that this rule would affect a substantial number of small entities but would not have a significant impact on them.

Generally, the final rule requires motor carriers to change the way cargo securement devices are used to prevent certain articles from shifting on or within, or falling from, CMVs. In some instances, the rule requires motor carriers to increase the number of tiedown devices used to secure certain types of cargoes. However, the rule does not require motor carriers to purchase new equipment.

The FMCSA finds that the vast majority of motor carriers have a sufficient supply of tiedown devices on board their vehicles at all times.

The agency believes the number of tiedowns on board and the strength of these devices are usually sufficient to secure whatever types of loads the motor carrier is transporting, or intends to transport. As we stated in the preamble to the notice of proposed rulemaking, the cargo securement problems typically observed during roadside inspections of flatbed trailers are ones in which motor carriers do not use enough of the tiedowns that they already have on board their vehicles. In the case of van type trailers, the problem is that some motor carriers do not use any securement devices to prevent loads from shifting. Therefore, FMCSA believes that motor carriers already have all the hardware they need to comply with the proposed changes. The challenge for motor carriers is to learn how to properly use tiedown devices to

further reduce the occurrence of cargo securement-related accidents.

Motor carriers are currently required to use tiedown devices that meet applicable manufacturing standards incorporated by reference in § 393.102(b). Under the final rule, the agency is continuing to require motor carriers to use only tiedown devices that meet manufacturing standards currently specified § 393.102(b). If the tiedowns are in safe and proper condition, and meet the applicable manufacturing standards, use of the devices is not prohibited by this rule.

As indicated above, additional costs may be associated with training of motor carrier employees responsible for loading CMVs, drivers, and enforcement officials to ensure that they understand the requirements being considered. The final rule does not adopt the provisions in the NPRM that distinguish between direct and indirect tiedowns. This means that there are very few aspects, if any, of the new requirements that differ significantly from the technical concepts in the current rules, and the best practices of the motor carrier industry. However, training may be desirable for some individuals. It is more likely than not that compliance with the final rule could be achieved with a minimal amount of training. This is because the commodity-specific rules have been drafted to enable the reader to use the rules as step-by-step instructions for securing the commodity being transported.

For motor carriers that provide training for their drivers, the costs could vary with the number of hours for training, and the number of drivers being trained. At a minimum, training costs would include wages for the drivers. The FMCSA reviewed earnings information from the U.S. Department of Labor. The FMCSA used the ''Occupational Outlook Handbook,'' 2000–01 Edition, Bulletin 2520. The median hourly earnings of drivers of light and heavy trucks were $11.67 in 1998. The middle 50 percent earned between $8.80 and $15.57 an hour. The lowest 10 percent earned less than $6.51 and the highest 10 percent earned more than $19.14 an hour.

If a motor carrier provided one hour of training for 10 drivers in the middle 50 percent, the maximum cost would be $155.70 (10 drivers × $15.57 an hour per driver × 1 hour) in wages for the drivers to attend training, plus the cost for the instructor and course materials. If the training for the same group of drivers was expanded to four hours the cost would be $622.80 (10 drivers x $15.57 an hour per driver x 4 hours) in wages for the drivers to attend training, plus the cost for the instructor, and course materials. If the drivers earned $20 an hour, the costs for the group of drivers to attend class for 4 hours would be $800. These examples indicate how the costs per motor carrier could vary greatly depending on the number of drivers to be trained, and the amount of training required.

The FMCSA cannot determine at this time the amount of training drivers and other motor carrier employees may need. However, the agency estimates that for a small entity employing 10 drivers the costs would not exceed $1,000 ($800 for drivers' wages + $200 for the instructor and course materials). The agency believes the economic impact on such motor carriers of these training costs will be minimal.

Accordingly, the FMCSA has considered the economic impacts of the requirements on small entities and certifies that this rule would not have a significant economic impact on a substantial number of small entities.

Unfunded Mandates Reform Act of 1995

This rule does not impose an unfunded Federal mandate, as defined by the Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1532 *et seq.*), that will result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $100 million or more in any one year.

Executive Order 12988 (Civil Justice Reform)

This action meets applicable standards in sections 3(a) and 3(b)(2) of Executive Order 12988, Civil Justice Reform, to minimize litigation, eliminate ambiguity, and reduce burden.

Executive Order 13045 (Protection of Children)

The FMCSA has analyzed this action under Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. This rule is not an economically significant rule and does not concern an environmental risk to health or safety that may disproportionately affect children.

Executive Order 12630 (Taking of Private Property)

This rule will not effect a taking of private property or otherwise have taking implications under Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights.

Executive Order 13132 (Federalism)

This action has been analyzed in accordance with the principles and criteria contained in Executive Order 13132. It has been determined that this rulemaking does not have a substantial direct effect on States, nor would it limit the policy-making discretion of the States. Nothing in this document preempts any State law or regulation.

Executive Order 12372 (Intergovernmental Review)

Catalog of Federal Domestic Assistance Program Number 20.217, Motor Carrier Safety. The regulations implementing Executive Order 12372 regarding intergovernmental consultation on Federal programs and activities do not apply to this program.

Paperwork Reduction Act

This action does not contain a collection of information requirement for the purposes of the Paperwork Reduction Act of 1995, 44 U.S.C. 3501 *et seq.*

National Environmental Policy Act

The Federal Motor Carrier Safety Administration (FMCSA) is a new administration within the Department of Transportation (DOT). We are striving to meet all of the statutory and executive branch requirements on rulemaking. The FMCSA is currently developing an agency order that will comply with all statutory and regulatory policies under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*). We expect the draft FMCSA Order to appear in the **Federal Register** for public comment in the near future. The framework of the FMCSA Order is consistent with and reflects the procedures for considering environmental impacts under DOT Order 5610.1C. The FMCSA analyzed this final rule under the NEPA and DOT Order 5610.1C. Since the final rule relates only to the way motor carriers use cargo securement devices to prevent certain articles from shifting on or within, or falling from CMVs, we believe it would be among the type of regulations that would be categorically excluded from any environmental assessment.

Executive Order 13211 (Energy Effects)

We have analyzed this action under Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution or Use. We have determined that it is not a ''significant energy action'' under that order because it is not economically significant and is not likely to have a significant adverse

effect on the supply, distribution, or use of energy.

List of Subjects

49 CFR Part 392

Highway safety, Motor carriers.

49 CFR Part 393

Highway safety, Incorporation by reference, Motor carriers, Motor vehicle safety.

In consideration of the foregoing, the FMCSA is amending title 49, Code of Federal Regulations, chapter III, as follows:

PART 392—[AMENDED]

1. The authority citation for part 392 continues to read as follows:

Authority: 49 U.S.C. 31136 and 31502; and 49 CFR 1.73.

2. Section 392.9 is revised to read as follows:

§ 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 motor vehicle unless—

(1) The commercial motor vehicle's cargo is properly distributed and adequately secured as specified in §§ 393.100 through 393.142 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 for 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 motor 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 for 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.

PART 393—[AMENDED]

3. The authority citation for part 393 continues to read as follows:

Authority: Section 1041(b) of Pub. L. 102–240, 105 Stat. 1914; 49 U.S.C. 31136 and 31502; and 49 CFR 1.73.

4. Amend § 393.5 to add the following definitions in alphabetical order:

§ 393.5 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.

* * * * *

Anchor point. Part of the structure, fitting or attachment on a vehicle or article of cargo to which a tiedown is attached.

* * * * *

Article of cargo. A unit of cargo, other than a liquid, gas, or aggregate that lacks physical structure (e.g., grain, gravel, etc.) including articles grouped together so that they can be handled as a single unit or unitized by wrapping, strapping, banding or edge protection device(s).

* * * * *

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.

Bracing. A structure, device, or another substantial article placed against an article of cargo to prevent it from tipping, that may also prevent it from shifting.

* * * * *

Dunnage. All loose materials used to support and protect cargo.

Dunnage bag. An inflatable bag intended to fill otherwise empty space between articles of cargo, or between articles of cargo and the wall of the vehicle.

* * * * *

Edge protector. A device placed on the exposed edge of an article to distribute tiedown forces over a larger area of cargo than the tiedown itself, to protect the tie-down and/or cargo from damage, and to allow the tiedown to slide freely when being tensioned.

* * * * *

Frame vehicle. A vehicle with skeletal structure fitted with one or more bunk units for transporting logs. A bunk unit consists of U-shaped front and rear bunks that together cradle logs. The bunks are welded, gusseted or otherwise firmly fastened to the vehicle's main beams, and are an integral part of the vehicle.

Friction mat. A device placed between the deck of a vehicle and article of cargo, or between articles of cargo, intended to provide greater friction than exists naturally between these surfaces.

* * * * *

g. The acceleration due to gravity, 32.2 ft/sec^2 (9.823 m/sec^2).

* * * * *

Hook-lift container. A specialized container, primarily used to contain and transport materials in the waste, recycling, construction/demolition and scrap industries, which is used in conjunction with specialized vehicles, in which the container is loaded and unloaded onto a tilt frame body by an articulating hook-arm.

* * * * *

Integral securement system. A system on certain roll-on/roll-off containers and hook-lift containers and their related transport vehicles in which compatible front and rear hold down devices are mated to provide securement of the complete vehicle and its articles of cargo.

* * * * *

Longwood. All logs that are not shortwood, i.e., are over 4.9 m (16 feet) long. Such logs are usually described as long logs or treelength.

* * * * *

Rail vehicle. A vehicle whose skeletal structure is fitted with stakes at the front

and rear to contain logs loaded crosswise.

* * * * *

Shoring bar. A device placed transversely between the walls of a vehicle and cargo to prevent cargo from tipping or shifting.

Shortwood. All logs typically up to 4.9 m (16 feet) long. Such logs are often described as cut-up logs, cut-to-length logs, bolts or pulpwood. Shortwood may be loaded lengthwise or crosswise, though that loaded crosswise is usually no more than 2.6 m (102 inches) long.

* * * * *

Sided vehicle. A vehicle whose cargo compartment is enclosed on all four sides by walls of sufficient strength to contain articles of cargo, where the walls may include latched openings for loading and unloading, and includes vans, dump bodies, and a sided intermodal container carried by a vehicle.

* * * * *

Tiedown. 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).

Tractor-pole trailer. A combination vehicle that carries logs lengthwise so that they form the body of the vehicle. The logs are supported by a bunk located on the rear of the tractor, and another bunk on the skeletal trailer. The tractor bunk may rotate about a vertical axis, and the trailer may have a fixed, scoping, or cabled reach, or other mechanical freedom, to allow it to turn.

* * * * *

Void filler. Material used to fill a space between articles of cargo and the structure of the vehicle that has sufficient strength to prevent movement of the articles of cargo.

* * * * *

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.

5. Section 393.7 is revised as follows:

§ 393.7 Matter incorporated by reference.

(a) *Incorporation by reference.* Part 393 includes references to certain matter or materials, as listed in paragraph (b) of this section. The text of the materials is not included in the regulations contained in part 393. The materials are hereby made a part of the regulations in part 393. The Director of the Federal Register has approved the materials incorporated by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. For materials subject to change, only the specific version approved by the Director of the Federal Register and specified in the regulation are incorporated. Material is incorporated as it exists on the date of the approval and a notice of any change in these materials will be published in the **Federal Register**.

(b) *Matter or materials referenced in part 393.* The matter or materials listed in this paragraph are incorporated by reference in the corresponding sections noted.

(1) Highway Emergency Signals, Fourth Edition, Underwriters Laboratories, Inc., UL No. 912, July 30, 1979, (with an amendment dated November 9, 1981), incorporation by reference approved for § 393.95(j).

(2) Standard Specification for Strapping, Flat Steel and Seals, American Society for Testing and Materials (ASTM), D3953–97, February 1998, incorporation by reference approved for § 393.104(e).

(3) Welded Steel Chain Specifications, National Association of Chain Manufacturers, November 15, 1999, incorporation by reference approved for § 393.104(e).

(4) Recommended Standard Specification for Synthetic Web Tiedowns, Web Sling and Tiedown Association, WSTDA–T1, 1998, incorporation by reference approved for § 393.104(e).

(5) Wire Rope Users Manual, 2nd Edition, Wire Rope Technical Board November 1985, incorporation by reference approved for § 393.104(e).

(6) Cordage Institute rope standards approved for incorporation into § 393.104(e):

(i) PETRS–2, Polyester Fiber Rope, 3-Strand and 8-Strand Constructions, January 1993;

(ii) PPRS–2, Polypropylene Fiber Rope, 3-Strand and 8-Strand Constructions, August 1992;

(iii) CRS–1, Polyester/Polypropylene Composite Rope Specifications, Three-Strand and Eight-Strand Standard Construction, May 1979;

(iv) NRS–1, Nylon Rope Specifications, Three-Strand and Eight-Strand Standard Construction, May 1979; and

(v) C–1, Double Braided Nylon Rope Specifications DBN, January 1984.

(c) *Availability.* The materials incorporated by reference are available as follows:

(1) Standards of the Underwriters Laboratories, Inc. Information and copies may be obtained by writing to: Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, Illinois 60062.

(2) Specifications of the American Society for Testing and Materials. Information and copies may be obtained by writing to: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428–2959.

(3) Specifications of the National Association of Chain Manufacturers. Information and copies may be obtained by writing to: National Association of Chain Manufacturers, P.O. Box 22681, Lehigh Valley, Pennsylvania 18002–2681.

(4) Specifications of the Web Sling and Tiedown Association. Information and copies may be obtained by writing to: Web Sling and Tiedown Association, Inc., 5024–R Campbell Boulevard, Baltimore, Maryland 21236–5974.

(5) Manuals of the Wire Rope Technical Board. Information and copies may be obtained by writing to: Wire Rope Technical Committee, P.O. Box 849, Stevensville, Maryland 21666.

(6) Standards of the Cordage Institute. Information and copies may be obtained by writing to: Cordage Institute, 350 Lincoln Street, # 115, Hingham, Massachusetts 02043.

(7)–(9) [Reserved].

(10) All of the materials incorporated by reference are available for inspection at:

(i) The Federal Motor Carrier Safety Administration, Office of Bus and Truck Standards and Operations, 400 Seventh Street, SW., Washington, DC 20590; and

(ii) The Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC.

6. Section 393.95(j) is amended by replacing the reference to ''§ 393.7(b)'' with ''§ 393.7(c).''

7. Subpart I of part 393 is revised to read as follows:

Subpart I—Protection Against Shifting and Falling Cargo

§ 393.100 Which types of commercial motor vehicles are subject to the 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.

§ 393.102 What are the minimum performance criteria for cargo securement devices and systems?

(a) *Performance criteria.* Cargo securement devices and systems must be capable of withstanding the following three forces, applied separately:

(1) 0.8 g deceleration in the forward direction;

(2) 0.5 g acceleration in the rearward direction; and

(3) 0.5 g acceleration in a lateral direction.

(b) *Performance criteria for devices to prevent vertical movement of loads that are not contained within the structure of the vehicle.* Securement systems must provide a downward force equivalent to at least 20 percent of the weight of the article of cargo if the article is not fully contained within the structure of the vehicle. If the article is fully contained within the structure of the vehicle, it may be secured in accordance with § 393.106(b).

(c) *Prohibition on exceeding working load limits.* Cargo securement devices and systems must be designed, installed, and maintained to ensure that the maximum forces acting on the devices or systems do not exceed the working load limit for the devices under the conditions listed in paragraphs (a) and (b) of this section.

(d) *Equivalent means of securement.* Cargo that is immobilized, or secured in accordance with the applicable requirements of §§ 393.104 through 393.136, is considered as meeting the performance criteria of this section.

§ 393.104 What standards must cargo securement devices and systems meet in order to satisfy the requirements of this subpart?

(a) *General.* All devices and systems used to secure cargo to or within a vehicle must be capable of meeting the requirements of § 393.102.

(b) *Prohibition on the use of damaged securement devices.* All vehicle structures, 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 that will adversely effect their performance for cargo securement purposes, including reducing the working load limit, and must not have any cracks or cuts.

(c) *Vehicle structures and anchor points.* Vehicle structures, floors, walls, decks, tiedown anchor points, headerboards, bulkheads, stakes, posts and associated mounting pockets used to contain or secure articles of cargo must be strong enough to meet the performance criteria of § 393.102, with no damaged or weakened components that will adversely effect their performance for cargo securement purposes, including reducing the working load limit, and must not have any cracks or cuts.

(d) *Material for dunnage, chocks, cradles, shoring bars, blocking and bracing.* Material used as dunnage or dunnage bags, chocks, cradles, shoring bars, or used for blocking and bracing, must not have damage or defects which would compromise the effectiveness of the securement system.

(e) *Manufacturing standards for tiedown assemblies.* Tiedown assemblies (including chains, wire rope, steel strapping, synthetic webbing, and cordage) and other attachment or fastening devices used to secure articles of cargo to, or in, commercial motor vehicles must conform to the following applicable standards:

An assembly component of . . .	Must conform to . . .
(1) Steel strapping [1, 2]	Standard Specification for Strapping, Flat Steel and Seals, American Society for Testing and Materials (ASTM) D3953–97, February 1998.[4]
(2) Chain	National Association of Chain Manufacturers' Welded Steel Chain Specifications, November 15, 1999.[4]
(3) Webbing	Web Sling and Tiedown Association's Recommended Standard Specification for Synthetic Web Tiedowns, WSTDA–T1, 1998.[4]
(4) Wire rope [3]	Wire Rope Technical Board's Wire Rope Users Manual, 2nd Edition, November 1985.[4]
(5) Cordage	Cordage Institute rope standard: (i) PETRS–2, Polyester Fiber Rope, three-Strand and eight-Strand Constructions, January 1993; [4] (ii) PPRS–2, Polypropylene Fiber Rope, three-Strand and eight-Strand Constructions, August 1992; [4] (iii) CRS–1, Polyester/Polypropylene Composite Rope Specifications, three-Strand and eight-Strand Standard Construction, May 1979; [4] (iv) NRS–1, Nylon Rope Specifications, three-Strand and eight-Strand Standard Construction, May 1979; [4] and

An assembly component of . . .	Must conform to . . .
	(v) C–1, Double Braided Nylon Rope Specifications DBN, January 1984.[4]

[1] Steel strapping not marked by the manufacturer with a working load limit will be considered to have a working load limit equal to one-fourth of the breaking strength listed in ASTM D3953–97.

[2] Steel strapping 25.4 mm (1 inch) or wider must have at least two pairs of crimps in each seal and, when an end-over-end lap joint is formed, must be sealed with at least two seals.

[3] 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 one-fourth of the nominal strength listed in the manual.

[4] See § 393.7 for information on the incorporation by reference and availability of this document.

(f) *Use of tiedowns.* (1) Tiedowns and securing devices must not contain knots.

(2) If a tiedown is repaired, it must be repaired in accordance with the applicable standards in paragraph (e) of this section, or the manufacturer's instructions.

(3) Each tiedown must be attached and secured in a manner that prevents it from becoming loose, unfastening, opening or releasing while the vehicle is in transit.

(4) All tiedowns and other components of a cargo securement system used to secure loads on a trailer equipped with rub rails, must be located inboard of the rub rails whenever practicable.

(5) Edge protection must be used whenever a tiedown would be subject to abrasion or cutting at the point where it touches an article of cargo. The edge protection must resist abrasion, cutting and crushing.

§ 393.106 What are the general requirements for securing articles of cargo?

(a) *Applicability.* The rules in this section are applicable to the transportation of all types of articles of cargo, except commodities in bulk that lack structure or fixed shape (*e.g.*, liquids, gases, grain, liquid concrete, sand, gravel, aggregates) and are transported in a tank, hopper, box or similar device that forms part of the structure of a commercial motor vehicle. The rules in this section apply to the cargo types covered by the commodity-specific rules of § 393.122 through § 393.142. The commodity-specific rules take precedence over the general requirements of this section when additional requirements are given for a commodity listed in those sections.

(b) *General.* 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.

(c) *Cargo placement and restraint.* (1) Articles of cargo that are likely to roll must be restrained by chocks, wedges, a cradle or other equivalent means to prevent rolling. The means of preventing rolling must not be capable of becoming unintentionally unfastened or loose while the vehicle is in transit.

(2) Articles or cargo placed beside each other and secured by transverse tiedowns must either:

(i) Be placed in direct contact with each other, or

(ii) Be prevented from shifting towards each other while in transit.

(d) *Minimum strength of cargo securement devices and systems.* The aggregate working load limit of any securement system 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:

(1) One-half of the working load limit of each associated connector or attachment mechanism used to secure a part of the article of cargo to the vehicle; and

(2) One-half of the working load limit for each end section of a tiedown that is attached to an anchor point.

§ 393.108 How is the working load limit of a tiedown determined?

(a) 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.

(b) The working load limits of tiedowns may be determined by using either the tiedown manufacturer's markings or by using the tables in this section. 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.

(c) 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.

(d) 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.

(e)(1) 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 one-fourth of the nominal strength listed in the Wire Rope Users Manual.

(2) Wire which is not marked or labeled to enable identification of its construction type shall be considered to have a working load limit equal to that for 6×37, fiber core wire rope.

(f) Manila rope which is not marked by the manufacturer with a working load limit shall be considered to have a working load limit based on its diameter as provided in the tables of working load limits.

(g) Friction mats which are not marked or rated by the manufacturer shall be considered to provide resistance to horizontal movement equal to 50 percent of the weight placed on the mat.

TABLES TO § 393.108

[Working Load Limits (WLL), Chain]

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 (1¾)	790 (1,750)
50 (2)	910 (2,000)
75 (3)	1,360 (3,000)
100 (4)	1,810 (4,000)

WIRE ROPE (6 X 37, FIBER CORE)

Diameter mm (inches)	WLL kg (pounds)
7 (1/4)	640 (1,400)
8 (5/16)	950 (2,100)
10 (3/8)	1,360 (3,000)
11 (7/16)	1,860 (4,100)
13 (1/2)	2,400 (5,300)
16 (5/8)	3,770 (8,300)
20 (3/4)	4,940 (10,900)
22 (7/8)	7,300 (16,100)
25 (1)	9,480 (20,900)

MANILA ROPE

Diameter mm (inches)	WLL kg (pounds)
10 (3/8)	90 (205)
11 (7/16)	120 (265)
13 (1/2)	150 (315)
16 (5/8)	210 (465)
20 (3/4)	290 (640)
25 (1)	480 (1,050)

POLYPROPYLENE FIBER ROPE WLL (3-STRAND AND 8-STRAND CONSTRUCTIONS)

Diameter mm (inches)	WLL kg (pounds)
10 (3/8)	180 (400)
11 (7/16)	240 (525)
13 (1/2)	280 (625)
16 (5/8)	420 (925)
20 (3/4)	580 (1,275)
25 (1)	950 (2,100)

POLYESTER FIBER ROPE WLL (3-STRAND AND 8-STRAND CONSTRUCTIONS)

Diameter mm (inches)	WLL kg (pounds)
10 (3/8)	250 (555)
11 (7/16)	340 (750)
13 (1/2)	440 (960)
16 (5/8)	680 (1,500)
20 (3/4)	850 (1,880)
25 (1)	1,500 (3,300)

NYLON ROPE

Diameter mm (inches)	WLL kg (pounds)
10 (3/8)	130 (278)
11 (7/16)	190 (410)
13 (1/2)	240 (525)
16 (5/8)	420 (935)
20 (3/4)	640 (1,420)
25 (1)	1,140 (2,520)

DOUBLE BRAIDED NYLON ROPE

Diameter mm (inches)	WLL kg (pounds)
10 (3/8)	150 (336)
11 (7/16)	230 (502)
13 (1/2)	300 (655)
16 (5/8)	510 (1,130)
20 (3/4)	830 (1,840)
25 (1)	1,470 (3,250)

STEEL STRAPPING

Width x thickness mm (inches)	WLL kg (pounds)
31.7 x .74 (1 1/4 x 0.029)	540 (1,190)
31.7 x .79 (1¼ x 0.031)	540 (1,190)
31.7 x .89 (1¼ x 0.035)	540 (1,190)
31.7 x 1.12 (1¼ x 0.044)	770 (1,690)
31.7 x 1.27 (1¼ x 0.05)	770 (1,690)
31.7 x 1.5 (1¼ x 0.057)	870 (1,925)
50.8 x 1.12 (2 x 0.044)	1,200 (2,650)
50.8 x 1.27 (2 x 0.05)	1,200 (2,650)

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

(a) In addition to the requirements of § 393.106, 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, and the requirements of paragraphs (b) and (c) of this section.

(b) 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:

(1) One tiedown for articles 5 feet (1.52 meters) or less in length, and 1,100 pounds (500 kg) or less in weight;

(2) Two tiedowns if the article is:

(i) 5 feet (1.52 meters) or less in length and more than 1,100 pounds (500 kg) in weight; or

(ii) Longer than 5 feet (1.52 meters) but less than or equal to 10 feet (3.04 meters) in length, irrespective of the weight.

(3) Two tiedowns if the article is longer than 10 feet (3.04 meters), and one additional tiedown for every 10 feet (3.04 meters) of article length, or fraction thereof, beyond the first 10 feet (3.04 meters) of length.

(c) If an individual article is required to be 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 3.04 meters (10 feet) or article length, or fraction thereof.

(d) *Special rule for special purpose vehicles.* The rules in this section do not apply to a vehicle transporting one or more articles of cargo such as, but not limited to, machinery or fabricated structural items (e.g., steel or concrete beams, crane booms, girders, and

trusses, etc.) which, because of their design, size, shape, or weight, must be fastened by special methods. However, any article of cargo carried on that vehicle must be securely and adequately fastened to the vehicle.

§ 393.112 Must a tiedown be adjustable?

Each tiedown, or its associated connectors, or its attachment mechanisms must be designed, constructed, and maintained so the driver of an in-transit commercial motor vehicle can tighten them. However, this requirement does not apply to the use of steel strapping.

§ 393.114 What are the requirements for front end structures used as part of a cargo securement system?

(a) *Applicability.* The rules in this section are applicable to commercial motor vehicles transporting articles of cargo that are in contact with the front end structure of the vehicle. The front end structure on these cargo-carrying vehicles must meet the performance requirements of this section.

(b) *Height and width.* (1) 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 article of cargo being carried on the vehicle, whichever is lower.

(2) 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.

(c) *Strength.* The front end structure must be capable of withstanding the following horizontal forward static load:

(1) For a front end structure less than 6 feet in height, a horizontal forward static load equal to one-half (0.5) of the weight of the articles of 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 article of the vehicle's cargo, whichever is less; or

(2) 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 articles of cargo being transported on the vehicle uniformly distributed over the entire front end structure.

(d) *Penetration resistance.* The front end structure must be designed, constructed, and maintained so that it is capable of resisting penetration by any article 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 article of cargo in contact with the structure to pass through it.

(e) *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 articles of cargo at least equal to, a front end structure which conforms to those requirements.

Specific Securement Requirements by Commodity Type

§ 393. 116 What are the rules for securing logs?

(a) *Applicability.* The rules in this section are applicable to the transportation of logs with the following exceptions:

(1) Logs that are unitized by banding or other comparable means may be transported in accordance with the general cargo securement rules of §§ 393.100 through 393.114.

(2) Loads that consist of no more than four processed logs may be transported in accordance with the general cargo securement rules of §§ 393.100 through 393.114.

(3) Firewood, stumps, log debris and other such short logs must be transported in a vehicle or container enclosed on both sides, front, and rear and of adequate strength to contain them. Longer logs may also be so loaded.

(b) *Components of a securement system.* (1) Logs must be transported on a vehicle designed and built, or adapted, for the transportation of logs. Any such vehicle must be fitted with bunks, bolsters, stakes or standards, or other equivalent means, that cradle the logs and prevent them from rolling.

(2) All vehicle components involved in securement of logs must be designed and built to withstand all anticipated operational forces without failure, accidental release or permanent deformation. Stakes or standards that are not permanently attached to the vehicle must be secured in a manner that prevents unintentional separation from the vehicle in transit.

(3) Tiedowns must be used in combination with the stabilization provided by bunks, stakes and bolsters to secure the load.

(c) *Use of securement system.* (1) Logs must be solidly packed, and the outer bottom logs must be in contact with and resting solidly against the bunks, bolsters, stakes or standards.

(2) Each outside log on the side of a stack of logs must touch at least two stakes, bunks, bolsters, or standards. If one end does not actually touch a stake, it must rest on other logs in a stable manner and must extend beyond the stake, bunk, bolster or standard.

(3) The center of the highest outside log on each side or end must be below the top of each stake, bunk or standard.

(4) Each log that is not held in place by contact with other logs or the stakes, bunks, or standards must be held in place by a tiedown. Additional tiedowns or securement devices must be used when the condition of the wood results in such low friction between logs that they are likely to slip upon each other.

(d) *Securement of shortwood logs loaded crosswise on frame, rail and flatbed vehicles.* In addition to the requirements of paragraphs (b) and (c) of this section, each stack of logs loaded crosswise must meet the following rules:

(1) In no case may the end of a log in the lower tier extend more than one-third of the log's total length beyond the nearest supporting structure on the vehicle.

(2) When only one stack of shortwood is loaded crosswise, it must be secured with at least two tiedowns. The tiedowns must attach to the vehicle frame at the front and rear of the load, and must cross the load in this direction.

(3) When two tiedowns are used, they must be positioned at approximately one-third and two-thirds of the length of the logs.

(4) A vehicle that is more than 10 meters (33 feet) long must be equipped with center stakes, or comparable devices, to divide it into sections approximately equal in length. Where a vehicle is so divided, each tiedown must secure the highest log on each side of the center stake, and must be fastened below these logs. It may be fixed at each end and tensioned from the middle, or fixed in the middle and tensioned from each end, or it may pass through a pulley or equivalent device in the middle and be tensioned from one end.

(5) Any structure or stake that is subjected to an upward force when the tiedowns are tensioned must be anchored to resist that force.

(6) If two stacks of shortwood are loaded side-by-side, in addition to meeting the requirements of paragraphs (d)(1) through (d)(5) of this section, they must be loaded so that:

(i) There is no space between the two stacks of logs;

(ii) The outside of each stack is raised at least 2.5 cm (1 in) within 10 cm (4 in) of the end of the logs or the side of the vehicle;

(iii) The highest log is no more than 2.44 m (8 ft) above the deck; and

(iv) At least one tiedown is used lengthwise across each stack of logs.

(e) *Securement of logs loaded lengthwise on flatbed and frame vehicles.* In addition to meeting the requirements of paragraphs (b) and (c) of this section, each stack of shortwood loaded lengthwise on a frame vehicle or on a flatbed must be secured to the vehicle by at least two tiedowns.

(f) *Securement of logs transported on pole trailers.* (1) The load must be secured by at least one tiedown at each bunk, or alternatively, by at least two tiedowns used as wrappers that encircle the entire load at locations along the load that provide effective securement.

(2) The front and rear wrappers must be at least 3.04 meters (10 feet) apart.

(3) Large diameter single and double log loads must be immobilized with chock blocks or other equivalent means to prevent shifting.

(4) Large diameter logs that rise above bunks must be secured to the underlying load with at least two additional wrappers.

§ 393.118 What are the rules for securing dressed lumber or similar building products?

(a) *Applicability.* The rules in this section apply to the transportation of bundles of dressed lumber, packaged lumber, building products such as plywood, gypsum board or other materials of similar shape. Lumber or building products which are not bundled or packaged must be treated as loose items and transported in accordance with §§ 393.100 through 393.114 of this subpart. For the purpose of this section, ''bundle'' refers to packages of lumber, building materials or similar products which are unitized for securement as a single article of cargo.

(b) *Positioning of bundles.* Bundles must be placed side by side in direct contact with each other, or a means must be provided to prevent bundles from shifting towards each other.

(c) *Securement of bundles transported using no more than one tier.* Bundles carried on one tier must be secured in accordance with the general provisions of §§ 393.100 through 393.114.

(d) *Securement of bundles transported using more than one tier.* Bundles carried in more than one tier must be either:

(1) Blocked against lateral movement by stakes on the sides of the vehicle and secured by tiedowns laid out over the top tier, as outlined in the general provisions of §§ 393.100 through 393.114; or

(2) Restrained from lateral movement by blocking or high friction devices between tiers and secured by tiedowns laid out over the top tier, as outlined in the general provisions of §§ 393.100 through 393.114; or

(3) Placed directly on top of other bundles or on spacers and secured in accordance with the following:

(i) The length of spacers between bundles must provide support to all pieces in the bottom row of the bundle.

(ii) The width of individual spacers must be equal to or greater than the height.

(iii) If spacers are comprised of layers of material, the layers must be unitized or fastened together in a manner which ensures that the spacer performs as a single piece of material.

(iv) The arrangement of the tiedowns for the bundles must be:

(A) Secured by tiedowns over the top tier of bundles, in accordance with the general provisions of §§ 393.100 through 393.114 with a minimum of two tiedowns for bundles longer than 1.52 meters (5 ft); and

(B) Secured by tiedowns in accordance with the general provisions of §§ 393.100 through 393.114 over the second tier or over a middle tier of a maximum height of 1.85 meters (6 ft) above the trailer deck, whichever is greater, for each stack of bundles composed of more than two tiers; or

(4) Secured by tiedowns over each tier of bundles, in accordance with §§ 393.100 through 393.114 using a minimum of two tiedowns over each of the top bundles longer than 1.52 meters (5 ft), in all circumstances.

§ 393.120 What are the rules for securing metal coils?

(a) *Applicability.* The rules in this section apply to the transportation of one or more metal coils which, individually or grouped together, weigh 2268 kg (5000 pounds) or more. Shipments of metal coils that weigh less than 2268 kg (5000 pounds) may be secured in accordance with the provisions of §§ 393.100 through 393.114.

(b) *Securement of coils transported with eyes vertical on a flatbed vehicle, in a sided vehicle or intermodal container with anchor points*—(1) *An individual coil.* Each coil must be secured by tiedowns arranged in a manner to prevent the coils from tipping in the forward, rearward, and lateral directions. The restraint system must include the following:

(i) At least one tiedown attached diagonally from the left side of the vehicle or intermodal container (near the forwardmost part of the coil), across the eye of the coil, to the right side of the vehicle or intermodal container (near the rearmost part of the coil);

(ii) At least one tiedown attached diagonally from the right side of the vehicle or intermodal container (near the forwardmost part of the coil), across the eye of the coil, to the left side of the vehicle or intermodal container (near the rearmost part of the coil);

(iii) At least one tiedown attached transversely over the eye of the coil; and

(iv) Either blocking and bracing, friction mats or tiedowns must be used to prevent longitudinal movement in the forward direction.

(2) *Coils grouped in rows.* When coils are grouped and loaded side by side in a transverse or longitudinal row, the each row of coils must be secured by the following:

(i) At least one tiedown attached to the front of the row of coils, restraining against forward motion, and whenever practicable, making an angle no more than 45 degrees with the floor of the vehicle or intermodal container when viewed from the side of the vehicle or container;

(ii) At least one tiedown attached to the rear of the row of coils, restraining against rearward motion, and whenever practicable, making an angle no more than 45 degrees with the floor of the vehicle or intermodal container when viewed from the side of the vehicle or container;

(iii) At least one tiedown over the top of each coil or transverse row of coils, restraining against vertical motion. Tiedowns going over the top of a coil(s) must be as close as practicable to the eye of the coil and positioned to prevent the tiedown from slipping or becoming unintentionally unfastened while the vehicle is in transit; and

(iv) Tiedowns must be arranged to prevent shifting or tipping in the forward, rearward and lateral directions.

(c) *Securement of coils transported with eyes crosswise on a flatbed vehicle, in a sided vehicle or intermodal container with anchor points*—(1) *An individual coil.* Each coil must be secured by the following:

(i) A means (*e.g.*, timbers, chocks or wedges, a cradle, etc.) to prevent the coil from rolling. The means of preventing rolling must support the coil off the deck, and must not be capable of becoming unintentionally unfastened or loose while the vehicle is in transit. If timbers, chocks or wedges are used, they must be held in place by coil bunks or similar devices to prevent them from coming loose. The use of nailed blocking or cleats as the sole means to secure timbers, chocks or wedges, or a nailed wood cradle, is prohibited;

(ii) At least one tiedown through its eye, restricting against forward motion, and whenever practicable, making an angle no more than 45 degrees with the floor of the vehicle or intermodal container when viewed from the side of the vehicle or container; and

(iii) At least one tiedown through its eye, restricting against rearward motion, and whenever practicable, making an angle no more than 45 degrees with the floor of the vehicle or intermodal container when viewed from the side of the vehicle or container.

(2) *Prohibition on crossing of tiedowns when coils are transported with eyes crosswise.* Attaching tiedowns diagonally through the eye of a coil to form an X-pattern when viewed from above the vehicle is prohibited.

(d) *Securement of coils transported with eyes lengthwise on a flatbed vehicle, in a sided vehicle or intermodal container with anchor points*—(1) *An individual coil-option 1.* Each coil must be secured by:

(i) A means (*e.g.*, timbers, chocks or wedges, a cradle, etc.) to prevent the coil from rolling. The means of preventing rolling must support the coil off the deck, and must not be capable of becoming unintentionally unfastened or loose while the vehicle is in transit. If timbers, chocks or wedges are used, they must be held in place by coil bunks or similar devices to prevent them from coming loose. The use of nailed blocking or cleats as the sole means to secure timbers, chocks or wedges, or a nailed wood cradle, is prohibited;

(ii) At least one tiedown attached diagonally through its eye from the left side of the vehicle or intermodal container (near the forward-most part of the coil), to the right side of the vehicle or intermodal container (near the rearmost part of the coil), making an angle no more than 45 degrees, whenever practicable, with the floor of the vehicle or intermodal container when viewed from the side of the vehicle or container;

(iii) At least one tiedown attached diagonally through its eye, from the right side of the vehicle or intermodal container (near the forward-most part of the coil), to the left side of the vehicle or intermodal container (near the rearmost part of the coil), making an angle no more than 45 degrees, whenever practicable, with the floor of the vehicle or intermodal container when viewed from the side of the vehicle or container;

(iv) At least one tiedown attached transversely over the top of the coil; and

(v) Either blocking, or friction mats to prevent longitudinal movement.

(2) *An individual coil—option 2.* Each coil must be secured by:

(i) A means (*e.g.*, timbers, chocks or wedges, a cradle, etc.) to prevent the coil from rolling. The means of preventing rolling must support the coil off the deck, and must not be capable of becoming unintentionally unfastened or loose while the vehicle is in transit. If timbers, chocks or wedges are used, they must be held in place by coil bunks or similar devices to prevent them from coming loose. The use of nailed blocking or cleats as the sole means to secure timbers, chocks or wedges, or a nailed wood cradle, is prohibited;

(ii) At least one tiedown attached straight through its eye from the left side of the vehicle or intermodal container (near the forward-most part of the coil), to the left side of the vehicle or intermodal container (near the rearmost part of the coil), and, whenever practicable, making an angle no more than 45 degrees with the floor of the vehicle or intermodal container when viewed from the side of the vehicle or container;

(iii) At least one tiedown attached straight through its eye, from the right side of the vehicle or intermodal container (near the forward-most part of the coil), to the right side of the vehicle or intermodal container (near the rearmost part of the coil), and whenever practicable, making an angle no more than 45 degrees with the floor of the vehicle or intermodal container when viewed from the side of the vehicle or container;

(iv) At least one tiedown attached transversely over the top of the coil; and

(v) Either blocking or friction mats to prevent longitudinal movement.

(3) *An individual coil—option 3.* Each coil must be secured by:

(i) A means (*e.g.*, timbers, chocks or wedges, a cradle, etc.) to prevent the coil from rolling. The means of preventing rolling must support the coil off the deck, and must not be capable of becoming unintentionally unfastened or loose while the vehicle is in transit. If timbers, chocks or wedges are used, they must be held in place by coil bunks or similar devices to prevent them from coming loose. The use of nailed blocking or cleats as the sole means to secure timbers, chocks or wedges, or a nailed wood cradle, is prohibited;

(ii) At least one tiedown over the top of the coil, located near the forward-most part of the coil;

(iii) At least one tiedown over the top of the coil located near the rearmost part of the coil; and

(iv) Either blocking or friction mats to prevent longitudinal movement.he forward direction.

(4) *Rows of coils.* Each transverse row of coils having approximately equal outside diameters must be secured with:

(i) A means (*e.g.*, timbers, chocks or wedges, a cradle, etc.) to prevent each coil in the row of coils from rolling. The means of preventing rolling must support each coil off the deck, and must not be capable of becoming unintentionally unfastened or loose while the vehicle is in transit. If timbers, chocks or wedges are used, they must be held in place by coil bunks or similar devices to prevent them from coming loose. The use of nailed blocking or cleats as the sole means to secure timbers, chocks or wedges, or a nailed wood cradle, is prohibited;

(ii) At least one tiedown over the top of each coil or transverse row, located near the forward-most part of the coil;

(iii) At least one tiedown over the top of each coil or transverse row, located near the rearmost part of the coil; and

(iv) Either blocking, bracing or friction mats to prevent longitudinal movement.

(e) *Securement of coils transported in a sided vehicle without anchor points or an intermodal container without anchor points.* Metal coils transported in a vehicle with sides without anchor points or an intermodal container without anchor points must be loaded in a manner to prevent shifting and tipping. The coils may also be secured using a system of blocking and bracing, friction mats, tiedowns, or a combination of these to prevent any horizontal movement and tipping.

§ 393.122 What are the rules for securing paper rolls?

(a) *Applicability.* The rules in this section apply to shipments of paper rolls which, individually or together, weigh 2268 kg (5000 lb) or more. Shipments of paper rolls that weigh less than 2268 kg (5000 lb), and paper rolls that are unitized on a pallet, may either be secured in accordance with the rules in this section or the requirements of §§ 393.100 through 393.114.

(b) *Securement of paper rolls transported with eyes vertical in a sided vehicle.* (1) Paper rolls must be placed tightly against the walls of the vehicle, other paper rolls, or other cargo, to prevent movement during transit.

(2) If there are not enough paper rolls in the shipment to reach the walls of the vehicle, lateral movement must be prevented by filling the void, blocking, bracing, tiedowns or friction mats. The paper rolls may also be banded together.

(3) When any void behind a group of paper rolls, including that at the rear of the vehicle, exceeds the diameter of the paper rolls, rearward movement must be prevented by friction mats, blocking,

bracing, tiedowns, or banding to other rolls.

(4)(i) If a paper roll is not prevented from tipping or falling sideways or rearwards by vehicle structure or other cargo, and its width is more than 2 times its diameter, it must be prevented from tipping or falling by banding it to other rolls, bracing, or tiedowns.

(ii) If the forwardmost roll(s) in a group of paper rolls is not prevented from tipping or falling forwards by vehicle structure or other cargo and it is restrained against forward movement by friction mat(s) alone, and its width is more than 1.75 times its diameter, it must be prevented from tipping or falling forwards by banding it to other rolls, bracing, or tiedowns.

(iii) Otherwise, when a paper roll or the forwardmost roll in groups of rolls that are not prevented from tipping or falling forwards by vehicle structure or other cargo and its width exceeds 1.25 times its diameter it must be prevented from tipping or falling by banding it to other rolls, bracing or tiedowns.

(5) If paper rolls are banded together, the rolls must be placed tightly against each other to form a stable group. The bands must be applied tightly, and must be secured so that they cannot fall off the rolls or to the deck.

(6) A friction mat used to provide the principal securement for a paper roll must protrude from beneath the roll in the direction in which it is providing that securement.

(c) *Securement of split loads of paper rolls transported with eyes vertical in a sided vehicle.* (1) If a paper roll in a split load is not prevented from forward movement by vehicle structure or other cargo, it must be prevented from forward movement by filling the open space, or by blocking, bracing, tiedowns, friction mats, or some combination of these.

(2) A friction mat used to provide the principal securement for a paper roll must protrude from beneath the roll in the direction in which it is providing that securement.

(d) *Securement of stacked loads of paper rolls transported with eyes vertical in a sided vehicle.* (1) Paper rolls must not be loaded on a layer of paper rolls beneath unless the lower layer extends to the front of the vehicle.

(2) Paper rolls in the second and subsequent layers must be prevented from forward, rearward or lateral movement by means as allowed for the bottom layer, or by use of a blocking roll from a lower layer.

(3) The blocking roll must be at least 38 mm (1.5 in) taller than other rolls, or must be raised at least 38 mm (1.5 in) using dunnage.

(4) A roll in the rearmost row of any layer must not be raised using dunnage.

(e) *Securement of paper rolls transported with eyes crosswise in a sided vehicle.* (1) The paper rolls must be prevented from rolling or shifting longitudinally by contact with vehicle structure or other cargo, by chocks, wedges or blocking and bracing of adequate size, or by tiedowns.

(2) Chocks, wedges or blocking must be held securely in place by some means in addition to friction, so they cannot become unintentionally unfastened or loose while the vehicle is in transit.

(3) The rearmost roll must not be secured using the rear doors of the vehicle or intermodal container, or by blocking held in place by those doors.

(4) If there is more than a total of 203 mm (8 in) of space between the ends of a paper roll, or a row of rolls, and the walls of the vehicle, void fillers, blocking, bracing, friction mats, or tiedowns must be used to prevent the roll from shifting towards either wall.

(f) *Securement of stacked loads of paper rolls transported with eyes crosswise in a sided vehicle.* (1) Rolls must not be loaded in a second layer unless the bottom layer extends to the front of the vehicle.

(2) Rolls must not be loaded in a third or higher layer unless all wells in the layer beneath are filled.

(3) The foremost roll in each upper layer, or any roll with an empty well in front of it, must be secured against forward movement by:

(i) Banding it to other rolls, or

(ii) Blocking against an adequately secured eye-vertical blocking roll resting on the floor of the vehicle which is at least 1.5 times taller than the diameter of the roll being blocked, or

(iii) Placing it in a well formed by two rolls on the lower row whose diameter is equal to or greater than that of the roll on the upper row.

(4) The rearmost roll in each upper layer must be secured by banding it to other rolls if it is located in either of the last two wells formed by the rearmost rolls in the layer below.

(5) Rolls must be secured against lateral movement by the same means allowed for the bottom layer when there is more than a total of 203 mm (8 in) of space between the ends of a paper roll, or a row of rolls, and the walls of the vehicle.

(g) *Securement of paper rolls transported with the eyes lengthwise in a sided vehicle.*

(1) Each roll must be prevented from forward movement by contact with vehicle structure, other cargo, blocking or tiedowns.

(2) Each roll must be prevented from rearward movement by contact with other cargo, blocking, friction mats or tiedowns.

(3) The paper rolls must be prevented from rolling or shifting laterally by contact with the wall of the vehicle or other cargo, or by chocks, wedges or blocking of adequate size.

(4) Chocks, wedges or blocking must be held securely in place by some means in addition to friction, so they cannot become unintentionally unfastened or loose while the vehicle is in transit.

(h) *Securement of stacked loads of paper rolls transported with the eyes lengthwise in a sided vehicle.* (1) Rolls must not be loaded in a higher layer if another roll will fit in the layer beneath.

(2) An upper layer must be formed by placing paper rolls in the wells formed by the rolls beneath.

(3) A roll in an upper layer must be secured against forward and rearward movement by any of the means allowed for the bottom layer, by use of a blocking roll, or by banding to other rolls.

(i) *Securement of paper rolls transported on a flatbed vehicle or in a curtain-sided vehicle*—(1) *Paper rolls with eyes vertical or with eyes lengthwise.*

(i) The paper rolls must be loaded and secured as described for a sided vehicle, and the entire load must be secured by tiedowns in accordance with the requirements of §§ 393.100 through 393.114.

(ii) Stacked loads of paper rolls with eyes vertical are prohibited.

(2) *Paper rolls with eyes crosswise.* (i) The paper rolls must be prevented from rolling or shifting longitudinally by contact with vehicle structure or other cargo, by chocks, wedges or blocking and bracing of adequate size, or by tiedowns.

(ii) Chocks, wedges or blocking must be held securely in place by some means in addition to friction so that they cannot become unintentionally unfastened or loose while the vehicle is in transit.

(iii) Tiedowns must be used in accordance with the requirements of §§ 393.100 through 393.114 to prevent lateral movement.

§ 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 §§ § 393.100 through 393.114.

(b) *General specifications for tiedowns.* (1) The aggregate working load limit of all tiedowns on any group of pipes must not be less than half the total weight of all the pipes 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 that tiedown causes 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 10×15 cm (4×6 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 filled.

(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.

(a) *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 though the front and rear pipes:

(A) 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.

(B) 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 tiedowns 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 or wire rope, must be placed longitudinally over the group of pipes;

(B) One transverse tiedown 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 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 is 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 only 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.

§ 393.126 What are the rules for securing intermodal containers?

(a) Applicability. The rules in this section apply to the transportation of intermodal containers. Cargo contained within an intermodal container must be secured in accordance with the provisions of §§ 393.100 through 393.114 or, if applicable, the commodity specific rules of this part.

(b) *Securement of intermodal containers transported on container chassis vehicle(s).* (1) Each intermodal container must be secured to the container chassis with securement devices or integral locking devices that cannot unintentionally become unfastened while the vehicle is in transit.

(2) The securement devices must restrain the container from moving more than 1.27 cm (1/2 in) forward, more than 1.27 cm (1/2 in) aft, more than 1.27 cm (1/2 in) to the right, more than 1.27 cm (1/2 in) to the left, or more than 2.54 cm (1 in) vertically.

(3) The front and rear of the container must be secured independently.

(c) *Securement of loaded intermodal containers transported on vehicles other than container chassis vehicle(s).* (1) All lower corners of the intermodal container must rest upon the vehicle, or the corners must be supported by a structure capable of bearing the weight of the container and that support structure must be independently secured to the motor vehicle.

(2) Each container must be secured to the vehicle by:

(i) Chains, wire ropes or integral devices which are fixed to all lower corners; or

(ii) Crossed chains which are fixed to all upper corners; and,

(3) The front and rear of the container must be secured independently. Each chain, wire rope, or integral locking device must be attached to the container in a manner that prevents it from being unintentionally unfastened while the vehicle is in transit.

(d) *Securement of empty intermodal containers transported on vehicles other than container chassis vehicle(s).* Empty intermodal containers transported on vehicles other than container chassis vehicles do not have to have all lower corners of the intermodal container resting upon the vehicle, or have all lower corners supported by a structure capable of bearing the weight of the empty container, provided:

(1) The empty intermodal container is balanced and positioned on the vehicle in a manner such that the container is stable before the addition of tiedowns or other securement equipment; and,

(2) The amount of overhang for the empty container on the trailer does not exceed five feet on either the front or rear of the trailer;

(3) The empty intermodal container must not interfere with the vehicle's maneuverability; and,

(4) The empty intermodal container is secured to prevent lateral, longitudinal, or vertical shifting.

§ 393.128 What are the rules for securing automobiles, light trucks and vans?

(a) *Applicability.* The rules in this section apply to the transportation of automobiles, light trucks, and vans which individually weigh 4,536 kg. (10,000 lb) or less. Vehicles which individually are heavier than 4,536 kg (10,000 lb) must be secured in accordance with the provisions of § 393.130 of this part.

(b) *Securement of automobiles, light trucks, and vans.*

(1) Automobiles, light trucks, and vans must be restrained at both the front and rear to prevent lateral, forward, rearward, and vertical movement using a minimum of two tiedowns.

(2) Tiedowns that are designed to be affixed to the structure of the automobile, light truck, or van must use the mounting points on those vehicles that have been specifically designed for that purpose.

(3) Tiedowns that are designed to fit over or around the wheels of an automobile, light truck, or van must provide restraint in the lateral, longitudinal and vertical directions.

(4) Edge protectors are not required for synthetic webbing at points where the webbing comes in contact with the tires.

§ 393.130 What are the rules for securing heavy vehicles, equipment and machinery?

(a) *Applicability.* The rules in this section apply to the transportation of heavy vehicles, equipment and machinery which operate on wheels or tracks, such as front end loaders, bulldozers, tractors, and power shovels and which individually weigh 4,536 kg (10,000 lb.) or more. Vehicles, equipment and machinery which is lighter than 4,536 kg (10,000 lb.) may also be secured in accordance with the provisions of this section, with § 393.128, or in accordance with the provisions of §§ 393.100 through 393.114.

(b) *Preparation of equipment being transported.* (1) Accessory equipment, such as hydraulic shovels, must be completely lowered and secured to the vehicle.

(2) Articulated vehicles shall be restrained in a manner that prevents articulation while in transit.

(c) *Securement of heavy vehicles, equipment or machinery with crawler tracks or wheels.* (1) In addition to the requirements of paragraph (b) of this section, heavy equipment or machinery with crawler tracks or wheels must be restrained against movement in the lateral, forward, rearward, and vertical direction using a minimum of four tiedowns.

(2) Each of the tiedowns must be affixed as close as practicable to the front and rear of the vehicle, or mounting points on the vehicle that have been specifically designed for that purpose.

§ 393.132 What are the rules for securing flattened or crushed vehicles?

(a) *Applicability.* The rules in this section apply to the transportation of vehicles such as automobiles, light trucks, and vans that have been flattened or crushed.

(b) *Prohibition on the use of synthetic webbing.* The use of synthetic webbing to secure flattened or crushed vehicles is prohibited.

(c) *Securement of flattened or crushed vehicles.* Flattened or crushed vehicles must be transported on vehicles which have:

(1) Containment walls or comparable means on four sides which extend to the full height of the load and which block against movement of the cargo in the forward, rearward and lateral directions; or

(2)(i) Containment walls or comparable means on three sides which extend to the full height of the load and which block against movement of the cargo in the forward, rearward and the lateral direction for which there is no containment wall or comparable means, and

(ii) A minimum of two tiedowns are required per vehicle stack; or

(3)(i) Containment walls on two sides which extend to the full height of the load and which block against movement of the cargo in the forward and rearward directions, and

(ii) A minimum of three tiedowns are required per vehicle stack; or

(4) A minimum of four tiedowns per vehicle stack.

(5) In addition to the requirements of paragraphs (c)(2), (3), and (4), the following rules must be satisfied:

(i) Vehicles used to transport flattened or crushed vehicles must be equipped with a means to prevent loose parts from falling from all four sides of the vehicle which extends to the full height of the cargo.

(ii) The means used to contain loose parts may consist of structural walls, sides or sideboards, or suitable covering material, alone or in combinations.

(iii) The use of synthetic material for containment of loose parts is permitted.

§ 393.134 What are the rules for securing roll-on/roll-off or hook lift containers?

(a) *Applicability.* The rules in this section apply to the transportation of roll-on/roll-off or hook lift containers.

(b) *Securement of a roll-on/roll-off and hook lift container.* Each roll-on/roll-off and hook lift container carried on a vehicle which is not equipped with an integral securement system must be:

(1) Blocked against forward movement by the lifting device, stops, a combination of both or other suitable restraint mechanism;

(2) Secured to the front of the vehicle by the lifting device or other suitable restraint against lateral and vertical movement;

(3) Secured to the rear of the vehicle with at least one of the following mechanisms:

(i) One tiedown attached to both the vehicle chassis and the container chassis;

(ii) Two tiedowns installed lengthwise, each securing one side of the container to one of the vehicle's side rails; or

(iii) Two hooks, or an equivalent mechanism, securing both sides of the container to the vehicle chassis at least as effectively as the tiedowns in the two previous items.

(4) The mechanisms used to secure the rear end of a roll-on/roll off or hook lift container must be installed no more than two meters (6 ft 7 in) from the rear of the container.

(5) In the event that one or more of the front stops or lifting devices are missing, damaged or not compatible, additional manually installed tiedowns must be used to secure the container to the vehicle, providing the same level of securement as the missing, damaged or incompatible components.

§ 393.136 What are the rules for securing large boulders?

(a) *Applicability.* (1) The rules in this section are applicable to the transportation of any large piece of natural, irregularly shaped rock weighing in excess of 5,000 kg (11,000 lb.) or with a volume in excess of 2 cubic-meters on an open vehicle, or in a vehicle whose sides are not designed and rated to contain such cargo.

(2) Pieces of rock weighing more than 100 kg (220 lb.), but less than 5,000 kg (11,000 lb.) must be secured, either in accordance with this section, or in accordance with the provisions of §§ 393.100 through 393.114, including:

(i) Rock contained within a vehicle which is designed to carry such cargo; or

(ii) Secured individually by tiedowns, provided each piece can be stabilized and adequately secured.

(3) Rock which has been formed or cut to a shape and which provides a stable base for securement must also be secured, either in accordance with the provisions of this section, or in accordance with the provisions of §§ 393.100 through 393.114.

(b) *General requirements for the positioning of boulders on the vehicle.* (1) Each boulder must be placed with its flattest and/or largest side down.

(2) Each boulder must be supported on at least two pieces of hard wood blocking at least 10 cm × 10 cm (4 inches × 4 inches) side dimensions extending the full width of the boulder.

(3) Hardwood blocking pieces must be placed as symmetrically as possible under the boulder and should support at least three-fourths of the length of the boulder.

(4) If the flattest side of a boulder is rounded or partially rounded, so that the boulder may roll, it must be placed in a crib made of hardwood timber fixed to the deck of the vehicle so that the boulder rests on both the deck and the timber, with at least three well-separated points of contact that prevent its tendency to roll in any direction.

(5) If a boulder is tapered, the narrowest end must point towards the front of the vehicle.

(c) *General tiedown requirements.* (1) Only chain may be used as tiedowns to secure large boulders.

(2) Tiedowns which are in direct contact with the boulder should, where possible, be located in valleys or notches across the top of the boulder, and must be arranged to prevent sliding across the rock surface.

(d) *Securement of a cubic shaped boulder.* In addition to the requirements of paragraphs (b) and (c) of this section, the following rules must be satisfied:

(1) Each boulder must be secured individually with at least two chain tiedowns placed transversely across the vehicle.

(2) The aggregate working load limit of the tiedowns must be at least half the weight of the boulder.

(3) The tiedowns must be placed as closely as possible to the wood blocking used to support the boulder.

(e) *Securement of a non-cubic shaped boulder—with a stable base.* In addition to the requirements of paragraphs (b) and (c) of this section, the following rules must be satisfied:

(1) The boulder must be secured individually with at least two chain tiedowns forming an ''X'' pattern over the boulder.

(2) The aggregate working load limit of the tiedowns must be at least half the weight of the boulder.

(3) The tiedowns must pass over the center of the boulder and must be attached to each other at the intersection by a shackle or other connecting device.

(f) *Securement of a non-cubic shaped boulder—with an unstable base.* In addition to the requirements of paragraphs (b) and (c) of this section, each boulder must be secured by a combination of chain tiedowns as follows:

(1) One chain must surround the top of the boulder (at a point between one-half and two-thirds of its height). The working load limit of the chain must be at least half the weight of the boulder.

(2) Four chains must be attached to the surrounding chain and the vehicle to form a blocking mechanism which prevents any horizontal movement. Each chain must have a working load limit of at least one-fourth the weight of the boulder. Whenever practicable, the angle of the chains must not exceed 45 degrees from the horizontal.

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Administrator.

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