RCW 46.37.490
Safety load chains and devices required.

It shall be unlawful to operate any vehicle upon the public highways of this state without having the load thereon securely fastened and protected by safety chains or other device.
(1) No vehicle shall be driven or moved on any public highway unless such vehicle is so constructed or loaded as to prevent any of its load from dropping, sifting, leaking, or otherwise escaping there from, except that sand may be dropped for the purpose of securing traction.
WASHINGTON STATE LAW
RCW 46.61.655

- CLEANING OF LOOSE DIRT / DEBRIS FROM VEHICLE BODY

- SUBSTANTIAL BODILY HARM IS A GROSS MISDEMEANOR (1\textsuperscript{ST} DEGREE)

- DAMAGE TO PROPERTY OF ANOTHER IS A MISDEMEANOR (2\textsuperscript{ND} DEGREE)

- OTHER LOSS / FAILURE TO SECURE IS AN INFRACTION
(3) Any vehicle operating on a paved public highway with a load of dirt, sand, or gravel susceptible to being dropped, spilled, leaked, or otherwise escaping there from shall be covered so as to prevent spillage. Covering of such loads is not required if six inches of freeboard is maintained within the bed.
(b) Any vehicle with deposits of mud, rocks, or other debris on the vehicle's body, fenders, frame, undercarriage, wheels, or tires shall be cleaned of such material before the operation of the vehicle on a paved public highway.
§ 393.100 Which types of commercial motor vehicles are subject to the cargo securement standards of this subpart, and what general requirements apply?
393.102(a)(b)(c)

- **(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.
(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 (The minimum performance criteria).
(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.
Each tie down must be adjustable, must be able to tighten load securement in-transit.
Securement systems must provide a downward force of at least 20% of the weight of the article of cargo.
Down force VS Weight

- 1 flat of berries = approximately 15 lbs.
- Standard flats are 12” X 16 ½” X 3”
- Stacked 20 flats high or 5’ by 8 wide = 2,400 lbs. per row.
- To secure one row you need 1,200 lbs. of WLL load securement and 480 lbs. of downforce.
- One 1-3/4” synthetic web strap = 1,750 lbs.
CFR 393.114

- Front end structure required must be at least 4’ high and the width of the vehicle.
- 1st row of cargo must be against headboard and each consecutive row must be in contact with the row in front of it. If not in contact or no headerboard each row will require 2 tiedowns minimum.
49 CFR 393.110

- If article is 5’ or less in length and 1,100 lbs. or less one tie down is required.
- If article is over 1,100 lbs. 2 tiedowns.
- If article is over 5’ in length 2 tiedowns are required + an additional tie down for every 10’ of length.
- Example item 24’ long requires 3 tiedowns minimum.
49 CFR 393.102(f)

- Tiedowns must not contain knots!
- Must use wenches, ratchets, binders.
Working Load Limit (WLL) defined

- 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.
WLL of rope

- ½” Manilla rope (WLL) = 315 lbs.
- ¾” Manilla rope (WLL) = 640 lbs.
- ½” Polyester rope (WLL) = 990 lbs.
- ¾” Polyester rope (WLL) = 1,880 lbs.
- 1 -3/4” synthetic webbing (WLL) = 1,750 lbs.
(4) Synthetic Webbing Defects

(a) The tie-down contains cut(s), burn(s), and/or hole(s) through the webbing which total more than that shown in the Defect Classification Table. (393.104(b))
1A
Cuts on same edge are not additive. Total defect size is 1/2".

1B
1/2" Cuts on opposite edges are additive. Total defect size is 1".

1C
1/2" Cuts and holes at different locations across the width are additive. Total defect size is 1/4".
(f)(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.
393.106(d)

The aggregate working load limit of tiedowns used to secure an article or group of articles against movement must be at least one-half the weight of the article or group of articles. The aggregate working load limit is the sum of:
393.106(d)(1)

(d)(1) One half the Aggregate WLL of each tiedown that goes from an anchor point on the vehicle to an anchor point on an article of cargo;
Example:

Machinery weight:
40,000 pounds.

You must secure for at least ½ the weight = 20,000 pounds.

If you have 4 chains with a WLL of 6,600 pounds (3/8\(^{th}\) grade 70) will that be enough load securement for this piece of machinery?
**NO.**

- You will need 7 chains.

- The original WLL is 6600 pounds, but when connected as shown, the chain WLL is one-half of the WLL and now has a WLL of 3300 pounds.
393.106(d)

- (d)(2) One half the WLL of each tiedown that is attached to an anchor point on the vehicle, passes through, over, or around the article of cargo, and is then attached to an anchor point on the same side of the vehicle.
Example:

Machinery weight:
40,000 pounds.

You must secure for at least \( \frac{1}{2} \) the weight = 20,000 pounds.

If you have 4 chains with a WLL of 6,600 pounds (3/8\(^{th}\) grade 70) will that be enough load securement for this piece of machinery?
- You will need 7 chains.

- The original WLL is 6600 pounds, but when connected as shown, the chain WLL is one-half of the WLL and now has a WLL of 3300 pounds.
393.106(d)(3)

(d)(3) the working load limit for each tiedown that goes from an anchor point on the vehicle through, over, or around the article of cargo and then attaches to another anchor point on the other side of the vehicle.
393.106(d)
Example:

Machinery weight:
40,000 pounds.

You must secure for at least \( \frac{1}{2} \) the weight = 20,000 pounds

You have 4 chains that are \( \frac{3}{8} \)th grade 30, each chain having a WLL of 2650 pounds. Is this enough load securement for this machinery?
You will need 8 chains.

The original WLL is 2650 pounds, nothing changes if you secure the load in this manner.
Chain- WLL

<table>
<thead>
<tr>
<th>Size mm (inches)</th>
<th>Grade 30 procoil</th>
<th>Grade 43 high test</th>
<th>Grade 70 transport</th>
<th>Grade 80 alloy</th>
<th>Grade 100 alloy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 7 (1/4)</td>
<td>580(1,300)</td>
<td>1,180(2,600)</td>
<td>1,430(3,150)</td>
<td>1,570(3,500)</td>
<td>1,950(4,300)</td>
</tr>
<tr>
<td>2. 8 (5/16)</td>
<td>860(1,900)</td>
<td>1,770(3,900)</td>
<td>2,130(4,700)</td>
<td>2,000(4,500)</td>
<td>2,600(5,700)</td>
</tr>
<tr>
<td>3. 10 (3/8)</td>
<td>1,200(2,650)</td>
<td>2,450(5,400)</td>
<td>2,990(6,600)</td>
<td>3,200(7,100)</td>
<td>4,000(8,800)</td>
</tr>
<tr>
<td>4. 11 (7/16)</td>
<td>1,680(3,700)</td>
<td>3,270(7,200)</td>
<td>3,970(8,750)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. 13 (1/2)</td>
<td>2,030(4,500)</td>
<td>4,170(9,200)</td>
<td>5,130(11,300)</td>
<td>5,400(12,000)</td>
<td>6,800(15,000)</td>
</tr>
<tr>
<td>6. 16 (5/8)</td>
<td>3,130(6,900)</td>
<td>5,910(13,000)</td>
<td>7,170(15,800)</td>
<td>8,200(18,100)</td>
<td>10,300(22,600)</td>
</tr>
</tbody>
</table>

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 - WLL

<table>
<thead>
<tr>
<th>Width mm (inches)</th>
<th>WLL kg (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 (1 ¾)</td>
<td>790(1,750)</td>
</tr>
<tr>
<td>50 (2)</td>
<td>910(2,000)</td>
</tr>
<tr>
<td>75 (3)</td>
<td>1,360(3,000)</td>
</tr>
<tr>
<td>100 (4)</td>
<td>1,810(4,000)</td>
</tr>
</tbody>
</table>
§ 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.
393.130(b)

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

- (b)(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.

(c)(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.
WHAT IS MISSING?????
Now that you know how to secure it.....

Let's look at the next pictures and find what is wrong.
Lighting At Night

- **Nighttime Movements**

  A vehicle or vehicle combinations not exceeding the defined envelope of 12 feet wide, 14 feet 6 inches high and 105 feet long, including legal overhang(s), may move at night. A vehicle or vehicle combination which exceeds the defined envelope may also be permitted to move at night on state highways subject to department preferred hours/routes of travel, and must have “Nighttime movement approved” stated on permits. All night moves must comply with published curfew restrictions. Night means one-half hour after sunset to one-half hour before sunrise. Vehicle and load must have proper lighting (49CFR 393.11).
Whenever the load upon any vehicle extends to the rear four feet or more beyond the bed or body of such vehicle there shall be displayed at the extreme rear end of the load, at the times specified in RCW 46.37.020, two red lamps, visible from a distance of at least five hundred feet to the rear, two red reflectors visible at night from all distances within six hundred feet to one hundred feet to the rear when directly in front of lawful lower beams of headlamps, and located so as to indicate maximum width, and on each side one red lamp, visible from a distance of at least five hundred feet to the side, located so as to indicate maximum overhang. There shall be displayed at all other times on any vehicle having a load which extends beyond its sides or more than four feet beyond its rear, red flags, not less than eighteen inches square, marking the extremities of such loads, at each point where a lamp would otherwise be required by this section, under RCW 46.37.020.
QUESTIONS
????????
CVEO 3 Tim Pearson
Office 509-886-6226
Cellphone 509-630-1529
Tim.Pearson@wsp.wa.gov

CVEO 2 Dean Robinson
Cellphone 509-654-2118
Dean.Robinson@wsp.wa.gov

CVEO 1 Brian Sackman
509-682-8090
Brian.Sackman@wsp.wa.gov
SGT. Ernie Rampley  
Office 509-881-2025  
Cellphone 509-670-1735  
Ernest.Rampley@wsp.wa.gov

Trooper Tim Kron  
Phone 509-765-6175  
Timothy.Kron@wsp.wa.gov

Trooper Steve Houle  
Phone 509-925-5303  
Steve.Houle@wsp.wa.gov