

**JOB AID**

# **Load Securement and Distribution**

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## North American Cargo Securement Standard

The North American Cargo Securement Standard forms the basis for the cargo securement and distribution regulations in the United States and Canada. The regulations are designed to ensure cargo will stay in place, keeping drivers and other motorists safe.

The North American Cargo Securement Standard does not allow a commercial vehicle to be operated until the vehicle's structure, equipment and cargo are properly placed and secured.

Vehicle elements that must be secured:

- Tailgates
- Doors
- Tarpaulins
- Spare tires
- Cargo securing equipment

No object can:

- Obscure the driver's front or side views
- Restrict the driver's arm/leg movement
- Block access to emergency supplies
- Prevent anyone from exiting the vehicle

The North American Cargo Securement Standard requires the cargo securement system to meet one of three conditions to prevent shifting and tipping:

- Cargo is fully contained
- Cargo is immobilized by structures or a combination of structure, blocking and bracing
- Cargo is immobilized or secured on or within a vehicle by tiedowns and either blocking, bracing, friction mats, other cargo, void fillers or a combination of these tools

## Forces Acting on Cargo

- **Forward force** is created from braking while driving straight ahead
- **Backward force** results from accelerating, shifting while climbing, or braking while backing
- **Side force** happens when a vehicle turns, changes lanes or brakes while turning
- **Upward force** occurs when the vehicle hits a bump or crests over a hill

## Securement System Elements

A securement system involves at least one of three elements:

- Vehicle structure
- Securing devices (use to assemble tiedowns)
- Blocking and bracing equipment (use seasoned hardwood with lengthwise grain)

Each **component** of a securement system must have a working load limit that is at least half the weight of the cargo it secures. A **working load limit** is the maximum load that can be safely applied to a securement system component.

A securement system's **aggregate working load limit** must be at least 50% of the weight of the cargo it secures. To calculate aggregate working load limit, add half the working load limit of each tiedown end section attached to an anchor point and half the working load limit of each end section attached to the cargo.

The securement system must be able to withstand:

- Forward force equivalent to 80% of the cargo weight
- Backward force equivalent to 50% of the cargo weight
- Sideways force equivalent to 50% of the cargo weight
- Downward force equivalent to 20% of the cargo weight

## **Tiedowns**

You can attach tiedowns in one of two ways:

1. Attach the tiedowns to the cargo by either of the following methods:
  - a. Attaching each tiedown directly to the cargo and the vehicle
  - b. Attaching each tiedown to the vehicle, passing it through or around the cargo, and then attaching it to the vehicle again
2. Pass the tiedowns over the cargo by attaching each tiedown to the vehicle, passing it over the cargo, then attaching it to the vehicle again

When you place tiedowns:

- Place the tiedowns as close as possible to spacers
- Place the tiedowns as symmetrically as possible over the cargo length
- Position tiedowns strategically to protect cargo integrity
- Remember that tiedowns prevent shifting more effectively if they have a steep angle
- If rubrails are present, place all tiedowns within the rubrails if possible

A **tiedown's working load limit** is equal to the smallest working load limit among its parts and anchor points. To figure out **how many tiedowns** to use on cargo, you must consider the cargo's weight and length as well as other means of preventing forward movement.

## **Securement and Distribution Methods**

- When you load items beside each other using side-to-side tiedowns, place them in contact with one another or block them to prevent shifting toward each other
- When you load cargo with a tendency to roll, provide more than one point of contact (lift the cargo off the deck and/or use roll-prevention devices)
- Always brace cargo if it has a tendency to tip
- Different types of concrete pipe must be secured differently
- In order to prevent concrete pipe from rolling, do one of the following:
  - Use a piece of blocking stretching between the pipe's quarter points
  - Use a piece of blocking at each of the pipe's quarter points

## Reminders

- Regulations differ for some cargo types because different securement methods are needed to meet the same regulatory goals
- If cargo is in danger of shifting/falling during transit, correct it before continuing
- The driver is responsible for inspection activities before and during transit unless:
  - The driver has been ordered not to open a sealed commercial vehicle
  - The vehicle is loaded in a manner making inspection impracticable