RIBCA Information Paper for Transit Protection of Intermediate Bulk Containers (IBCs)

August 2, 2018 (Reformatted)

RIBCA-NA

Purpose

- This paper will provide an overview of the various securement practices for users of industrial IBC's. It will help in determining the load securement method that is best for the shipper.
- This paper was prepared and endorsed by the Rigid Intermediate Bulk Container Association of North America (RIBCA-NA) in conjunction with Down River, an ITW Company.

Why Load Securement?

Proper Load Securement = Safety and Savings

Defining Load Securement

Load securement is a method or a means of effectively securing or immobilizing cargo during transit.

Why is Load Securement so Important?

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SAFETY: For Loaders, Un-loaders, Carriers and Public

- The Federal Motor Cargo Safety Administration (FMCSA) report to Congress on the Large Truck Crash Causation Study of 2006, reported 147,000 large truck crashes in U.S.
- 95,000 people were injured.
- Cargo shifting and improper securement issues were primary or contributing factors in at least 7% of these crashes.
- 10,290 crashes and 6,650 injuries were caused by improper load securement.

Unsafe Cargo to Unload

Why is Load Securement so Important?

Compliance

- FMCSA Law – In 2004, the FMCSA published new cargo securement rules. These rules can and will be enforced by federal, state and provincial enforcement officials in the U.S. and Canada.
- AAR Rules of Loading and Bracing Methods including a loading guide specifically for boxcars and TOFC/COFC (shipping containers and piggybacks).

Why is Load Securement so Important?

Compliance

From the AAR Intermodal Loading Guide:

"It must be understood that trailers or containers may move in a backwards or reverse direction for all or a portion of their journey. During its journey, normal transportation forces will shift an unsecured load or cause lading to exert excessive pressure against the nose, rear doors or side walls**. It is therefore, imperative that trailers or containers moving in rail service be loaded by the shippers in strict compliance with the General Rules as contained in this AAR publication.** Shipper is defined in these rules as that party or his agent who is responsible for the physical loading and securement of the lading in the trailer or container."

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Why is Load Securement so Important?

Compliance

The Cost of Not Properly Securing Your Cargo

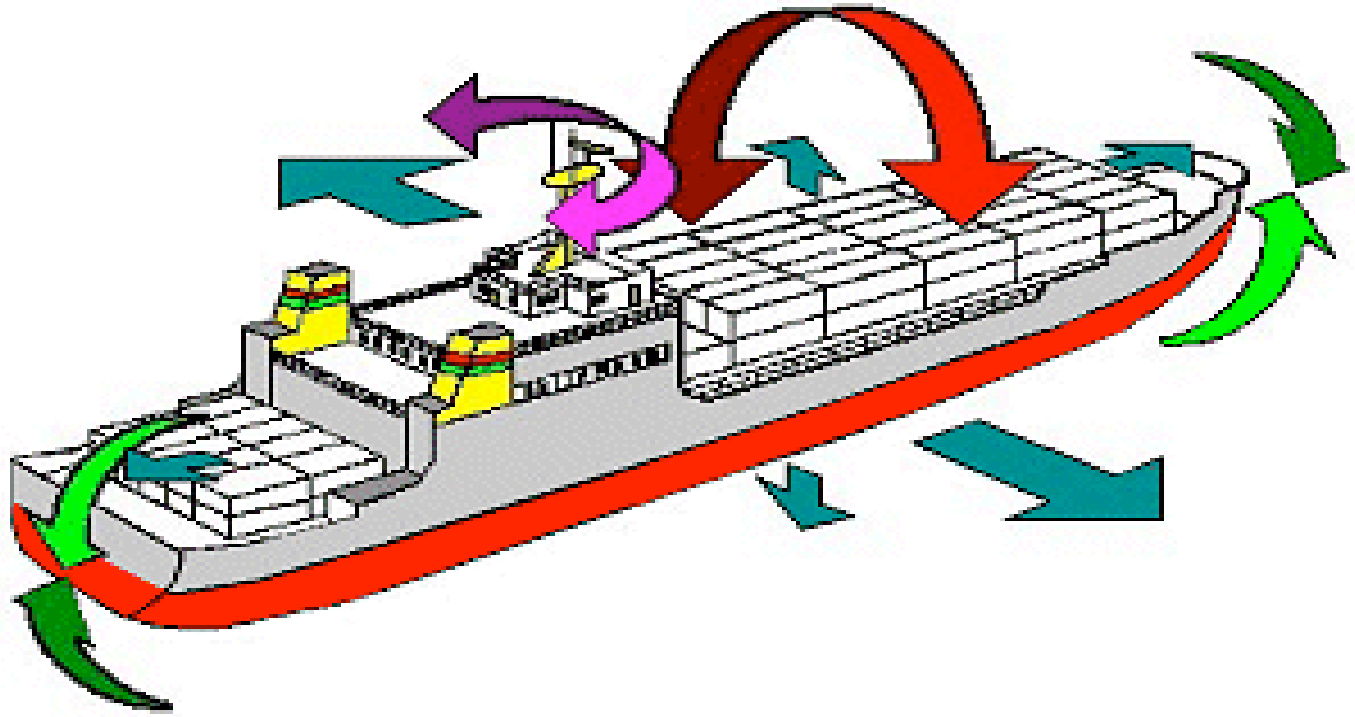
- LAWSUITS – Potentially the most damaging costs
- Claims, deductibles and administration cost
- Customer dissatisfaction
- Clean up, sanitation, restacking loads, extra handling costs
- Reworking product costs
- Replacement packaging costs
- Replacement product costs
- Replacement freight costs

Ocean Transit Environment

Ocean Transit

Ocean Transit

The most complicated transportation environment. It may has as many as six different forces all working at the same time. Different magnitudes of G-Forces and directions will affect the cargo.

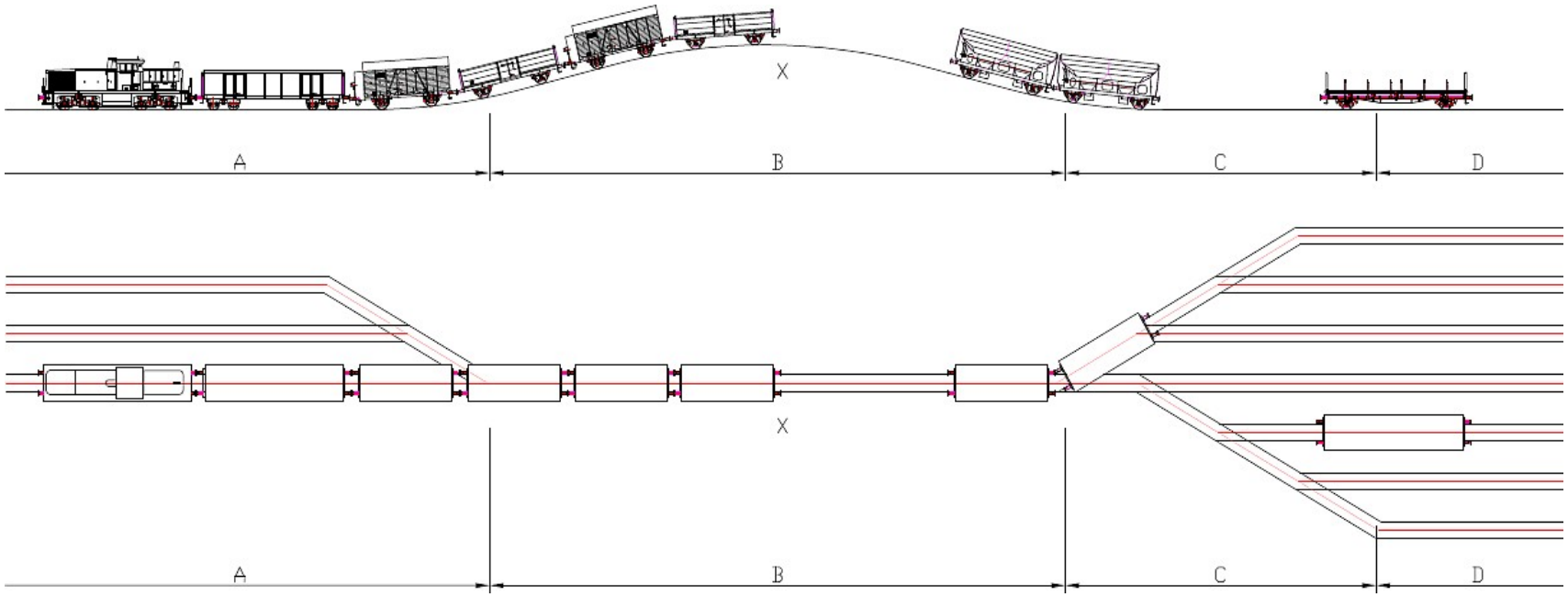


Rail Transit Environment

Rail Transit

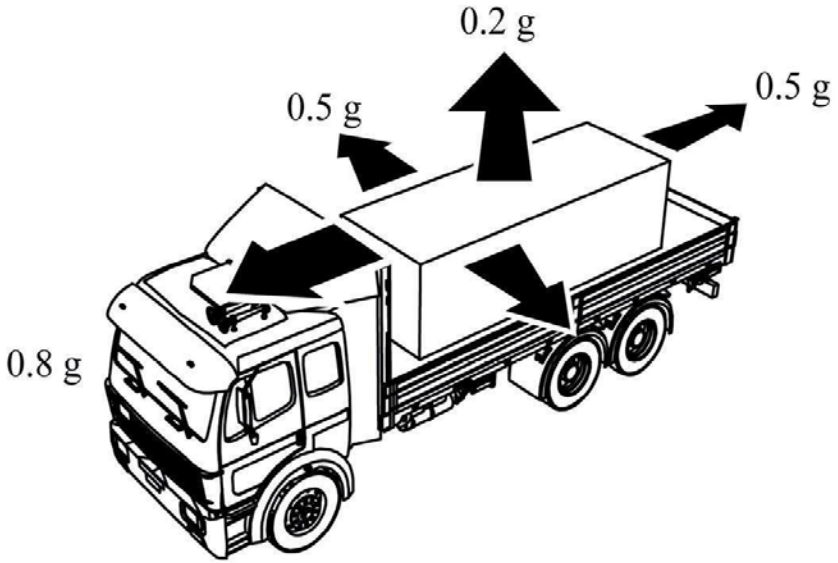
Rail Environment “Hump Yard”

HUMP: A raised section in a rail sorting yard that allows operators to use gravity to more freight railcars (6 PMH) into the proper position within the yard when making up trains of cars (“humping” the cars).



Over the Road Environment

Each cargo securement system must be able to withstand a minimum amount of force in each direction.



- **Forward Force** = 80% of cargo weight when braking while driving straight ahead
- **Rearward Force** = 50% of cargo weight when accelerating, shifting gears while climbing a hill, or braking in reverse
- **Sideways Force** = 50% of cargo weight when turning, changing lanes, or braking while turning
- **Upward Force** = 20% of cargo weight when traveling over bumps in the road or cresting a hill

This requirement is satisfied when the cargo is "Fully Contained."

.5 g is 50% of force of gravity or 50% of cargo weight.

Common Load Securement Devices

Wood Blocking and Bracing

PROS

- Custom fit
- Can be strong
- First method of blocking and bracing
- Material is easy to obtain

CONS

- Labor intensive
- Expensive
- Skill required (carpenter?)
- Exposed wood (quarantined at some international destinations)
- Safety (nail gun, hammer, nails, etc.)
- Difficult to remove at receiving end

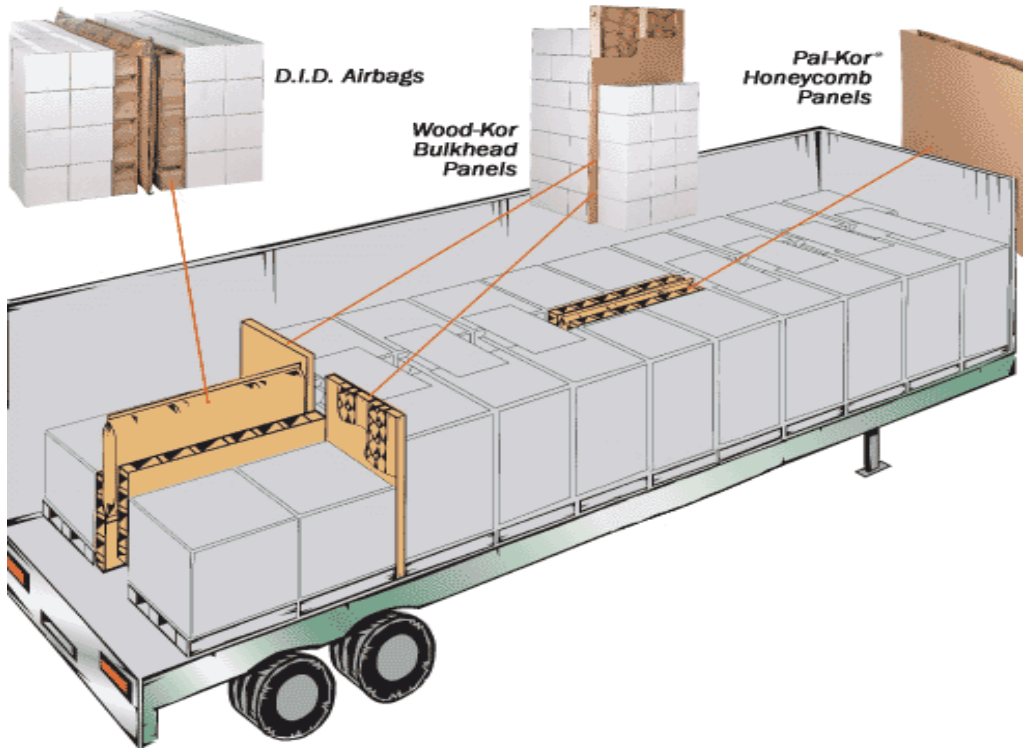
Wood Blocking and Bracing

Wood Blocking and Bracing

Not acceptable by American Association of Railroads (AAR) for “step ups” and “step downs.”

Wood Blocking and Bracing

When your loads require “step ups” or “step downs,” you can use a Wood-Kor Bulkhead to securely brace your product and prevent movement.



Strapping and Lashing

PROS

- Inexpensive
- Flexible restraint (round drums, IBC, etc.)
- Strong
- Easy to use
- Unitizing securement or container securement

CONS

- Can be labor intensive
- Dependent on container anchors
- Not many approvals by AAR for Hazmat
- Thin surface area may damage packaging

**Strapping can be steel, poly or nylon*

Strapping and Lashing

Straps are used to unitize 4 IBCs in combination with friction mats

Straps are used for unitizing the lading and straps go thru eye hooks in trailer wall

Rubber Friction Mats

PROS

- Inexpensive
- Ease of installation
- Good C.O.F. with metal and paper and wood

CONS

- Usually requires additional securement method
- Does not work well for tall units or double stacks, due to tipping

Dunnage Air Bags

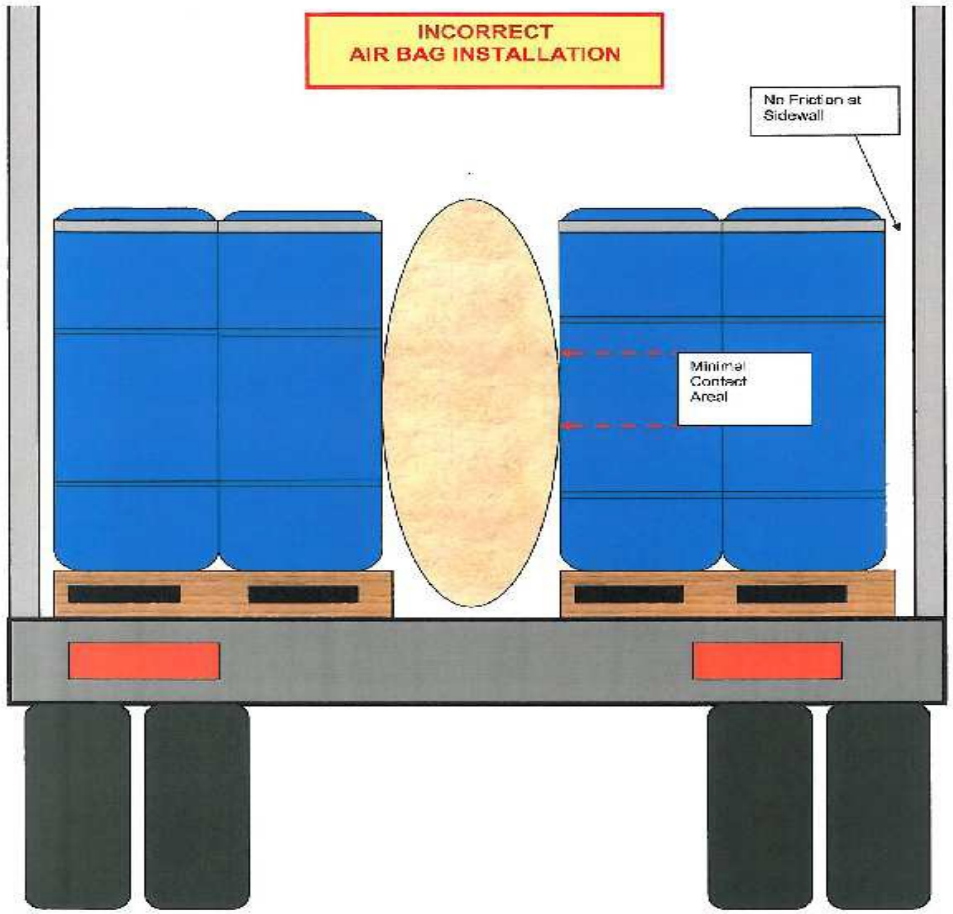
PROS

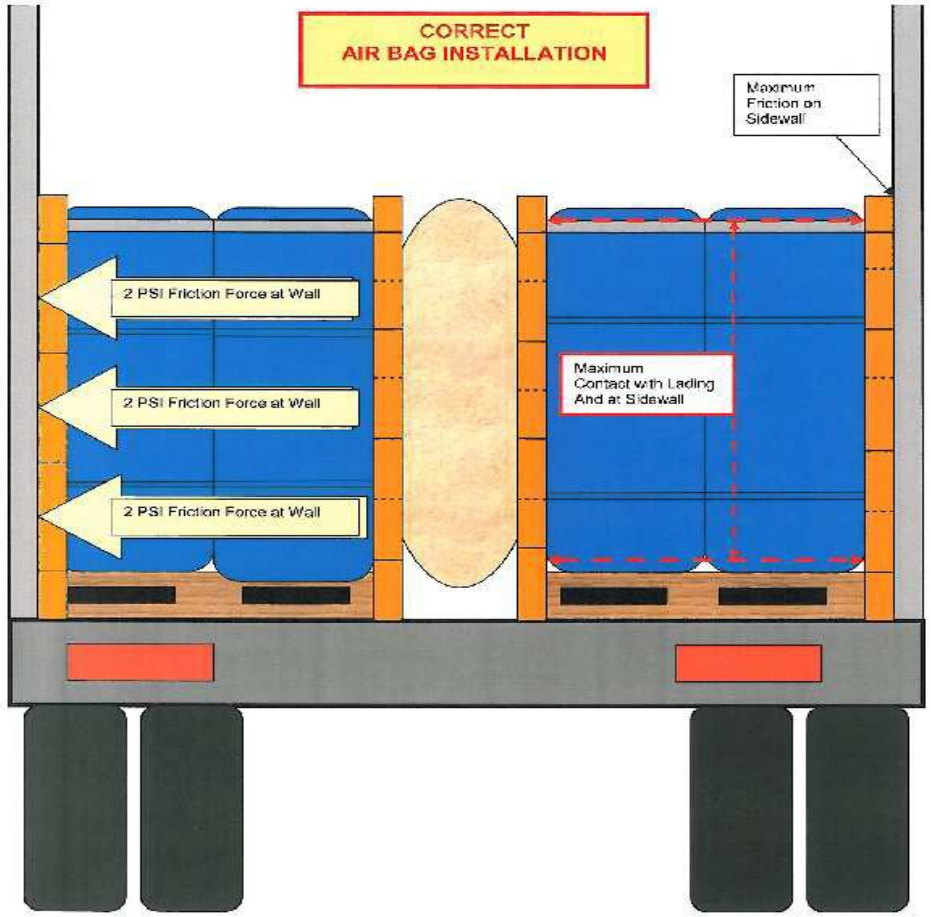
- Fits multiple void sizes
- True blocking and bracing
- Will secure lading in all six directions
- Versatile
- Unit size

CONS

- Often incorrectly installed
- Subject to leaks or rupture
- Not AAR Hazmat approved
- Dock area not installed with air lines
- Atmospheric conditions will lose air pressure

Dunnage Air Bags





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Dunnage Air Bags

Maximum contact with both IBC's…

The pressure (2psi of friction force) from the airbag must be sufficient to move the IBC's so they make contact with the sidewall of the trailer.

Void Fillers

PROS

- Light and strong
- Inexpensive
- Works with single units
- Custom designed
- Recyclable
- Can possibly be reused

CONS

- Often incorrectly installed
- Not adjustable in size
- Because not adjustable in size you may have to carry more than one SKU
- Bulky sizes requires a sizable amount of warehouse space

Corrugated Void Fillers

Honeycomb panel

Drop down void fillers
(dual riders, saddlepacks, etc.)

Corrugated Bulk Head Systems

PROS

- Strong
- Used for weight distribution
- Quick installs
- Fill large voids

CONS

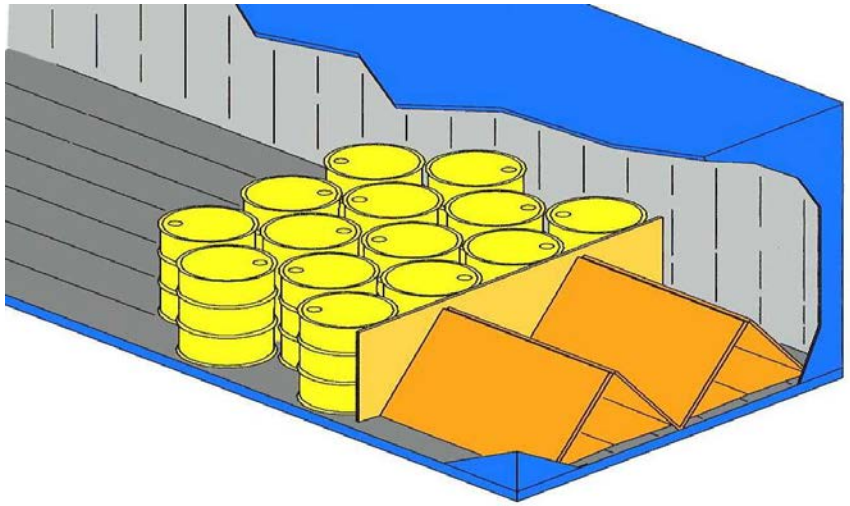
- Cost
- Difficult to handle

Corrugated Bulk Head Systems

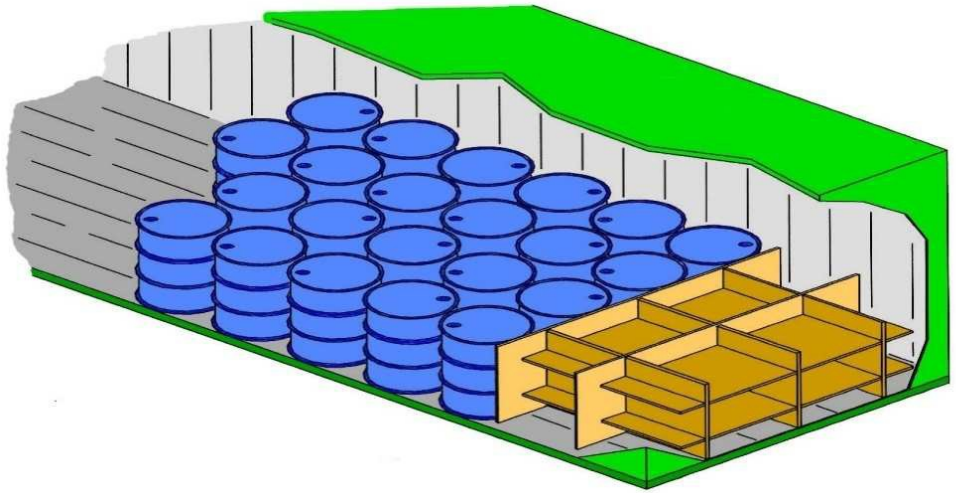
M-Frame bulk head system

Load

Corrugated Bulk Head Systems

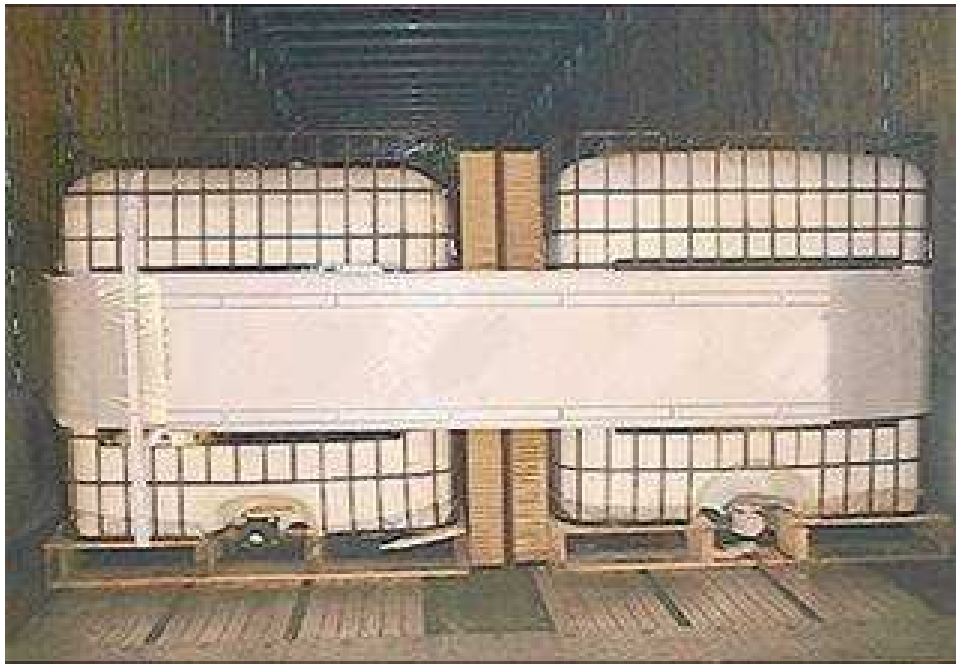


M-Frame bulk head



Load & lock bulk head

16” Poly Banding



PROS

- AAR Hazmat approvals
- Works well with contoured packaging (drums, pails, IBC's)

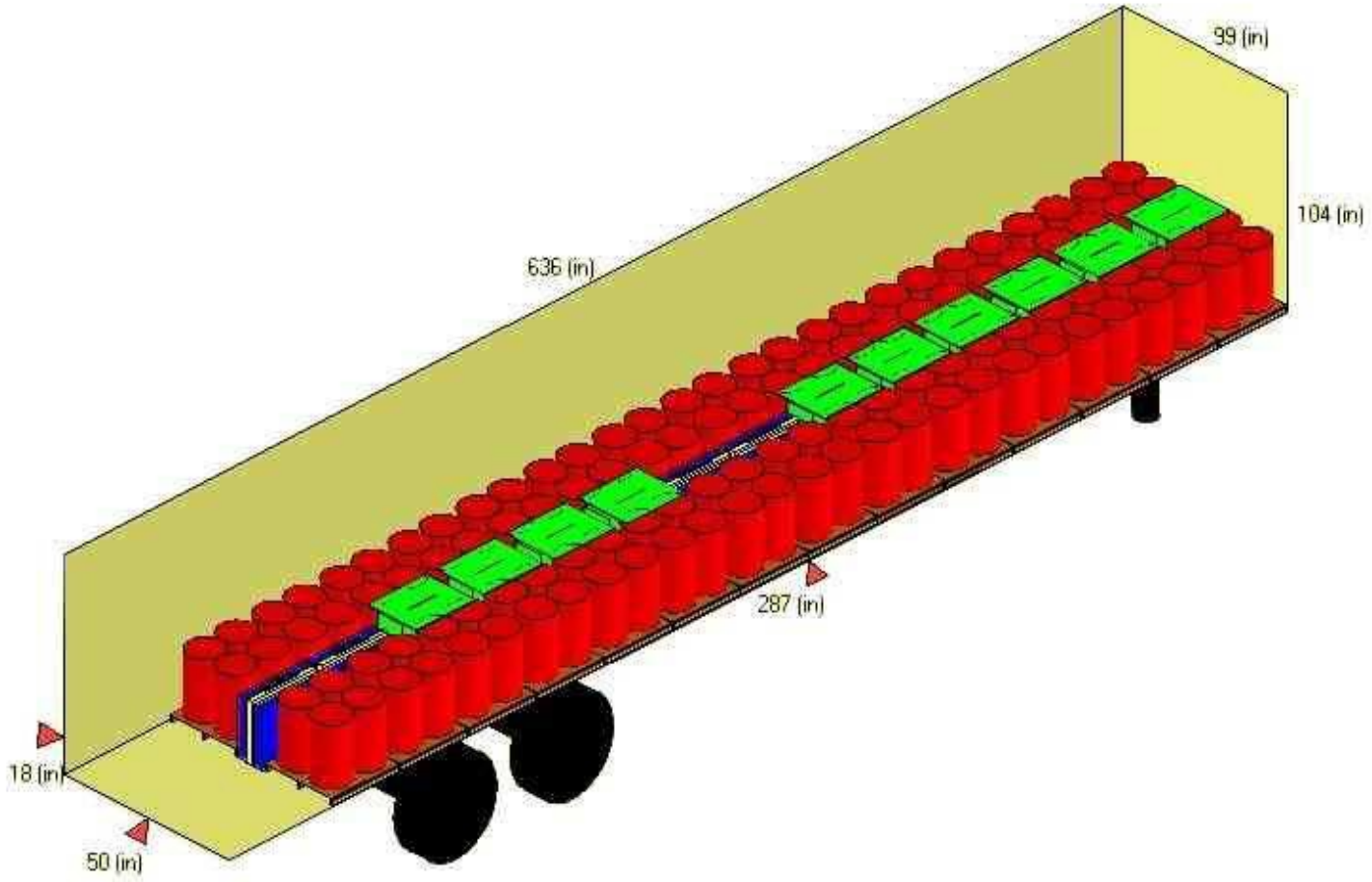
CONS

- Cost
- Labor intensive
- Restricts lading movement in one direction only
- Can fall down if not taped

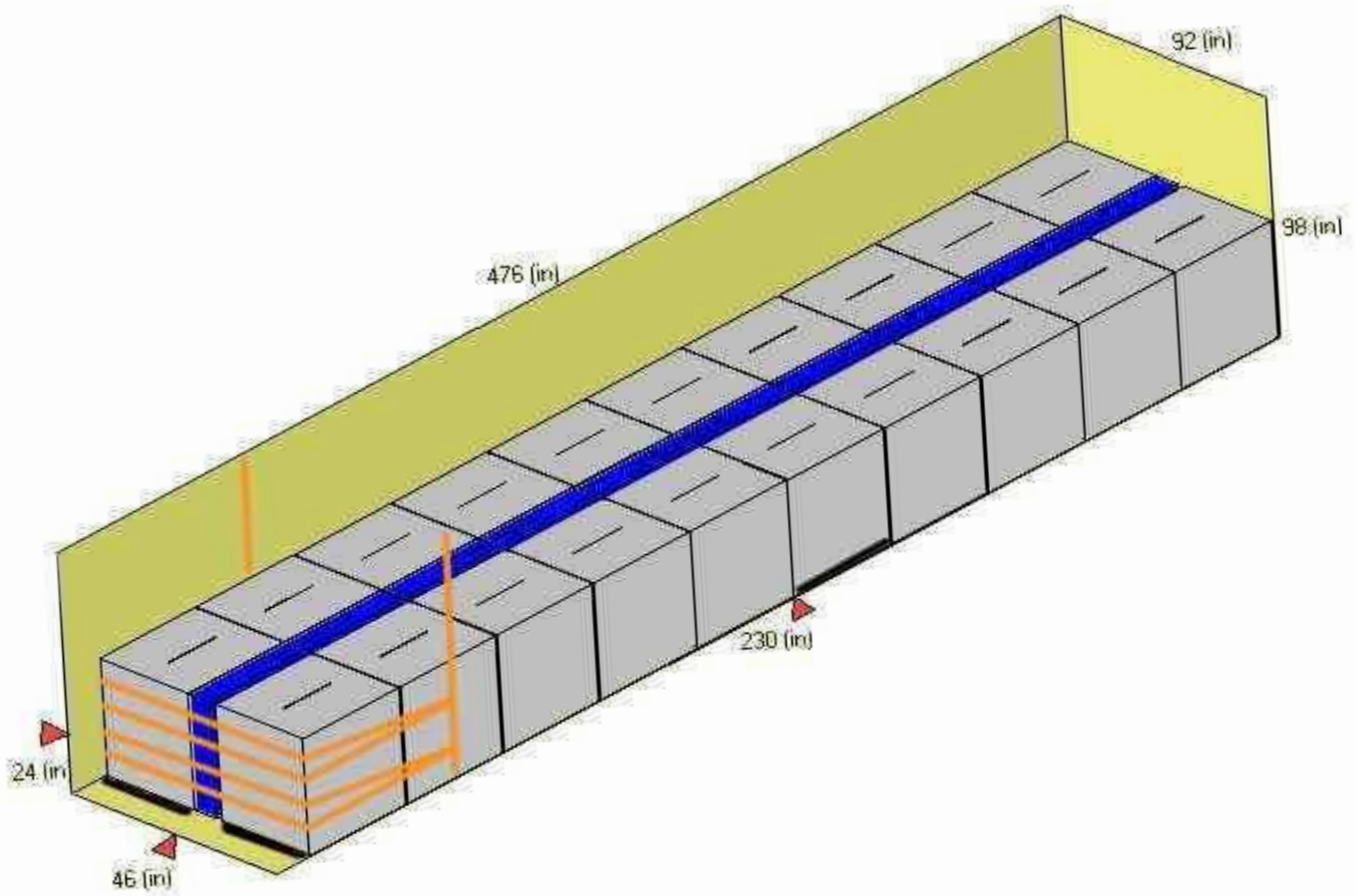
Load Securement Systems

A “Load Securement System” is several load securement devices and/or methods used to secure an entire cargo load during transit.

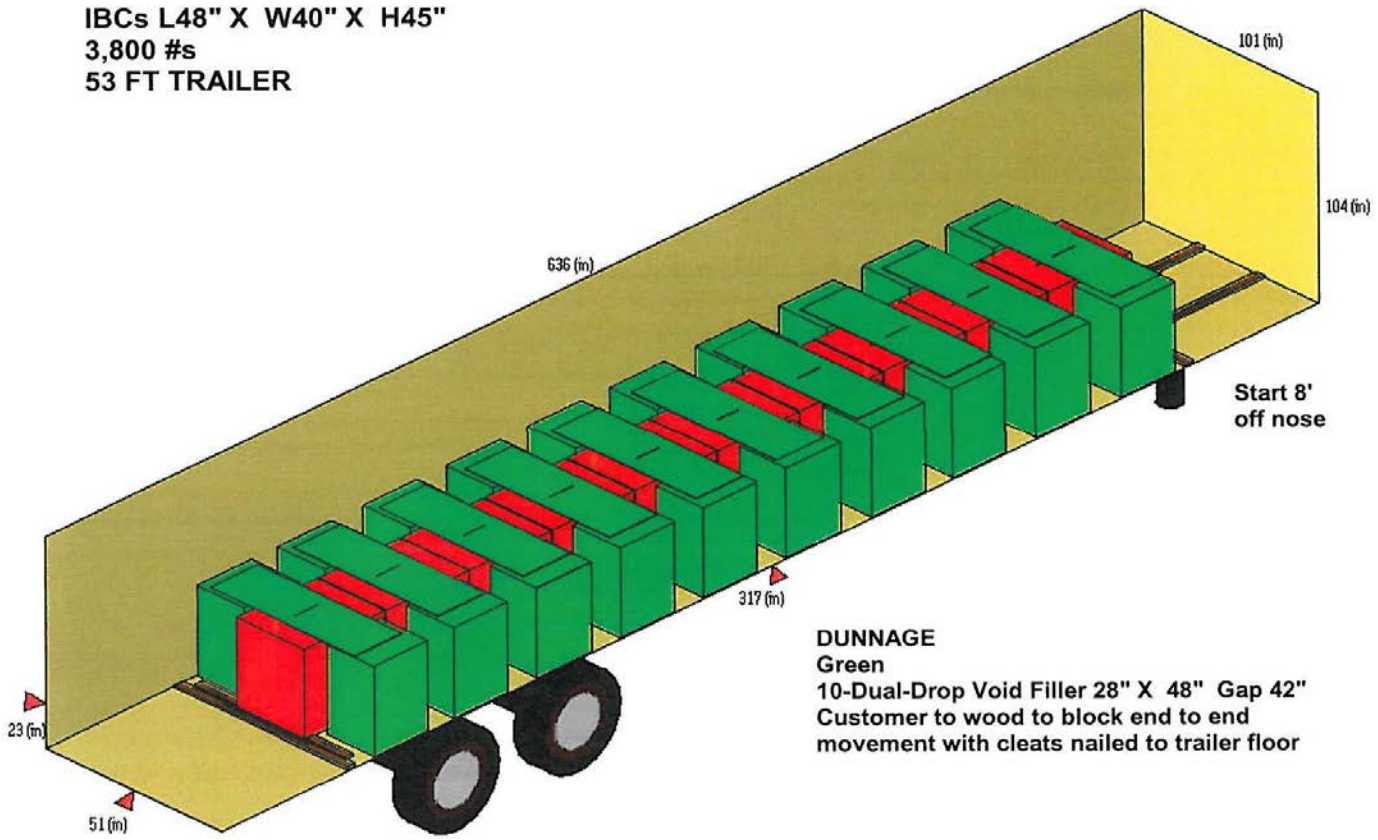
System-Airbags with Void Filler



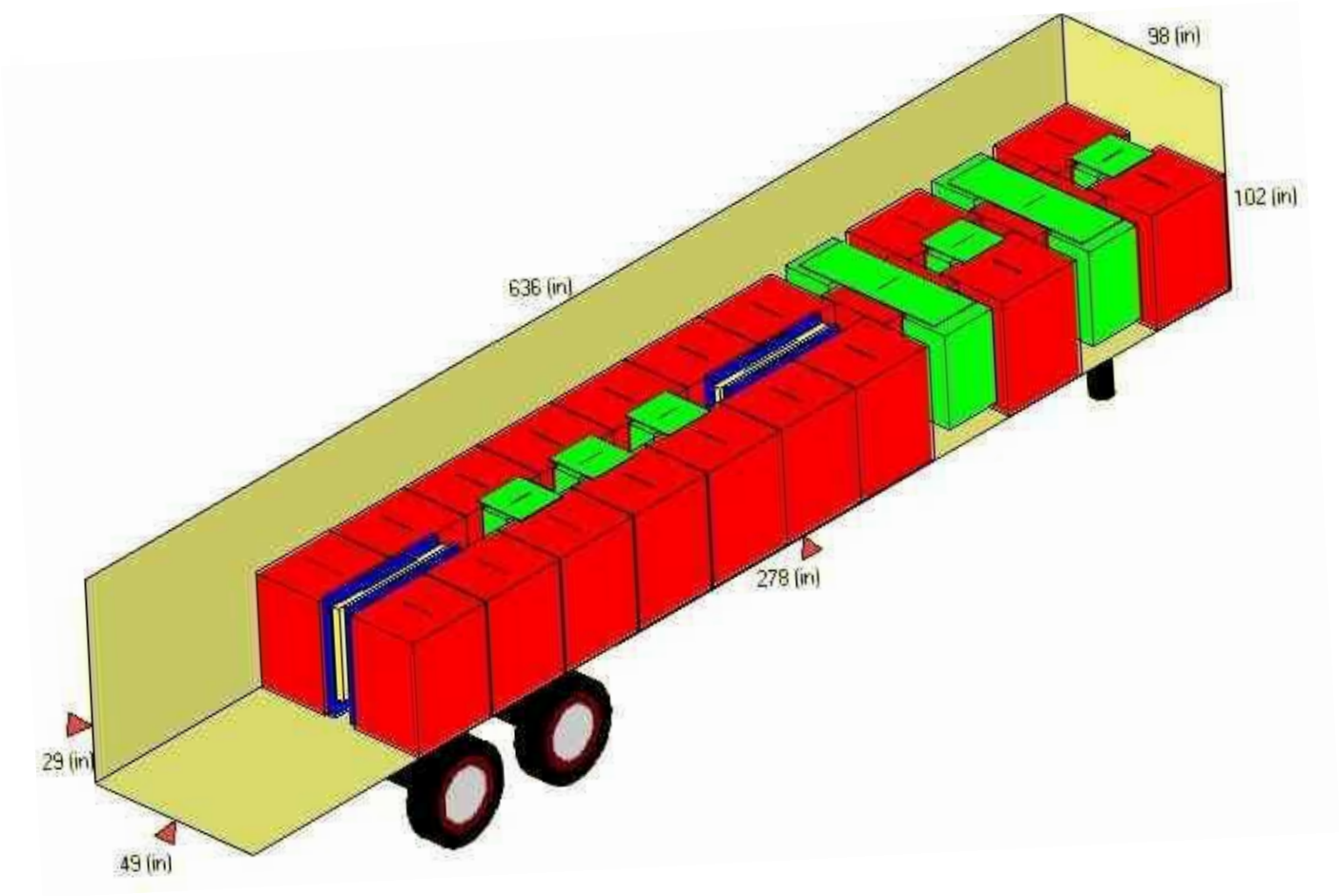
System-Strapping with Friction Mats and Void Fillers



System where the weight of the lading is such that the weight limitation of the trailer is reached before the volume of the trailer is filled. This system uses Void fillers and wood blocking.



System-Combination of Void Filler with Air Bags



Cargo Can Be Secured in More Than One Way

- The important thing is…Secure Your Cargo. If you have question, please consult:
  - **A load securement professional**
  - **Load securement and damage prevention companies**
  - **Class one railroads experts**
- FMCSA's Cargo Securement Handbook can be downloaded at:

  http://www.fmcsa.dot.gov/rules-regulations/truck/vehicle/cs.htm
- AAR Intermodal Loading Guide can be ordered at:

  http://www.aarpublications.com/Publications/Intermodal.aspx

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The Rigid Intermediate Bulk Container Association (RIBCA) is a trade association, which represents manufacturers of intermediate bulk containers, package testing companies and polyethylene resin manufacturers in North America.

Down River an ITW Company

Down River is a manufacturer of load securement products with five locations in North America.

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