



**Information Paper
For
Transit Protection of
Intermediate Bulk Containers (IBC's)**



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 (RIBCA) of North America 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 Important?





Why is load securement so important?

SAFETY

For Loaders, Un-loaders, Carriers and Public

- The Federal Motor Cargo Safety Administration report to congress on the Large Truck Crash Causation Study 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 important

COMPLIANCE

- FMCSA Law- In 2004 the Federal Motor Cargo Safety Administration (FMCSA) published new cargo securement rules. These rules can and will be enforced by Federal, State and Provincial enforcement officials in 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 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.”



Why is load securement important?

Liability

The cost of not properly securing your cargo

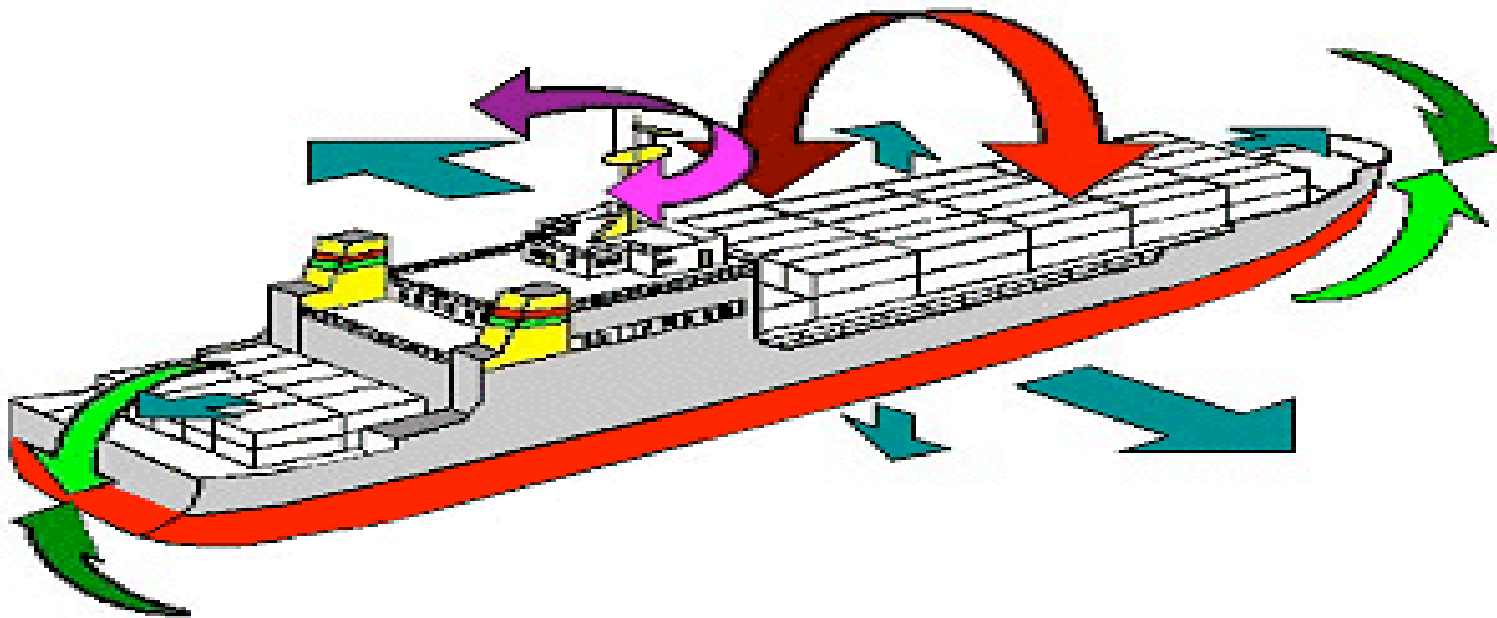
- **LAWSUITS- (Potentially the most damaging costs)**
- **Claims, Deductibles and Administration Cost.**
- **Customer Dissatisfaction**
- **Clean Up, Sanitation, Restacking Loads, Extra Handling Costs**
- **Reworking Product Costs**
- **Replacement Packaging Costs**
- **Replacement Product Costs**
- **Replacement Freight Costs**

Ocean Transit Environment



Ocean Transit

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

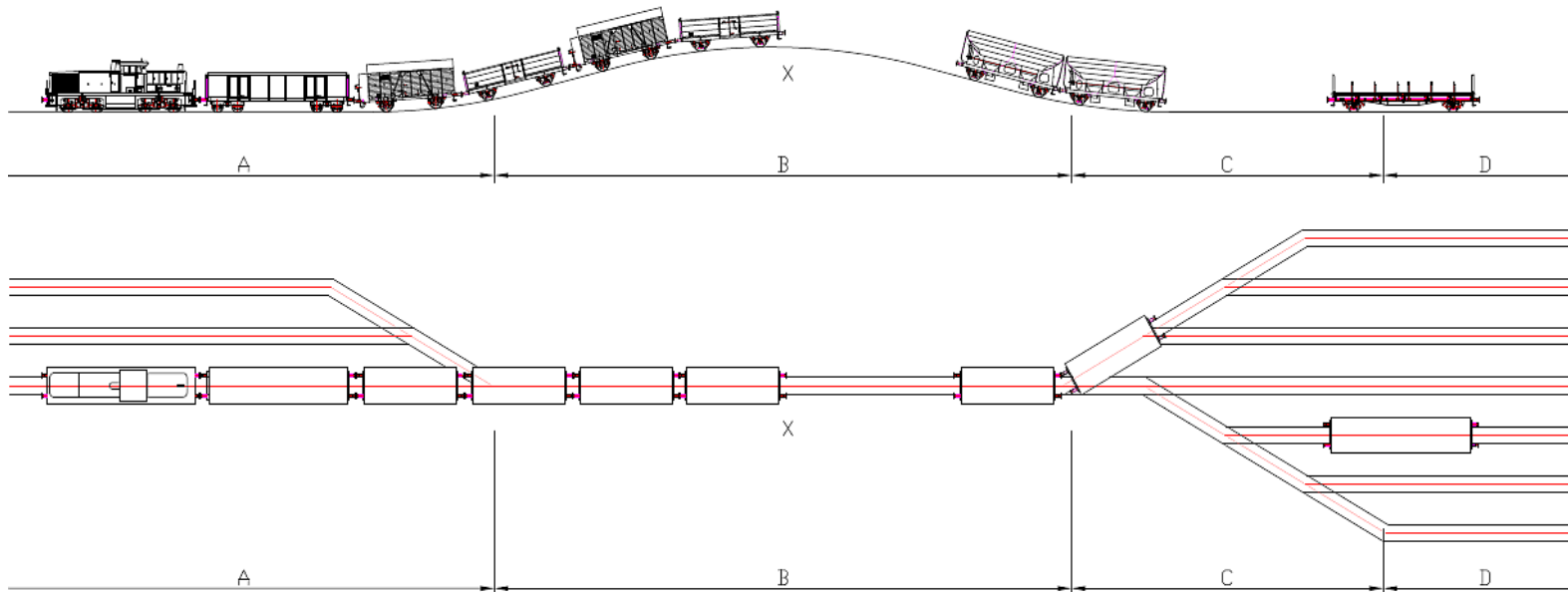


Rail Transit Environment



Rail Environment “Hump Yard”

HUMP: A raised section in a rail sorting yard that allows operators to use gravity to move freight railcars (6 MPH) 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.

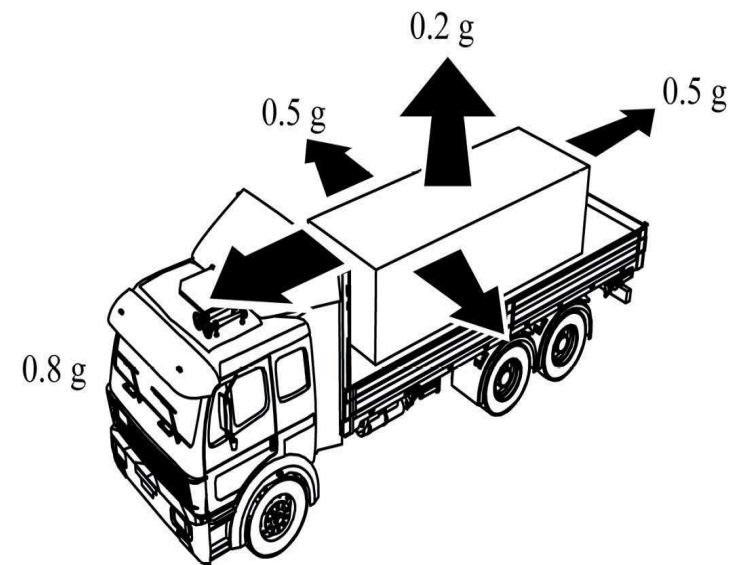
Forward Force = 80% of cargo weight when braking while driving straight ahead.

Rearward Force = 50% of cargo weight when accelerating, shifting gears while climbing a hill, or braking in reverse.

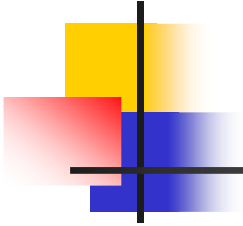
Sideways Force = 50% of cargo weight when turning, changing lanes, or braking while turning.

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



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

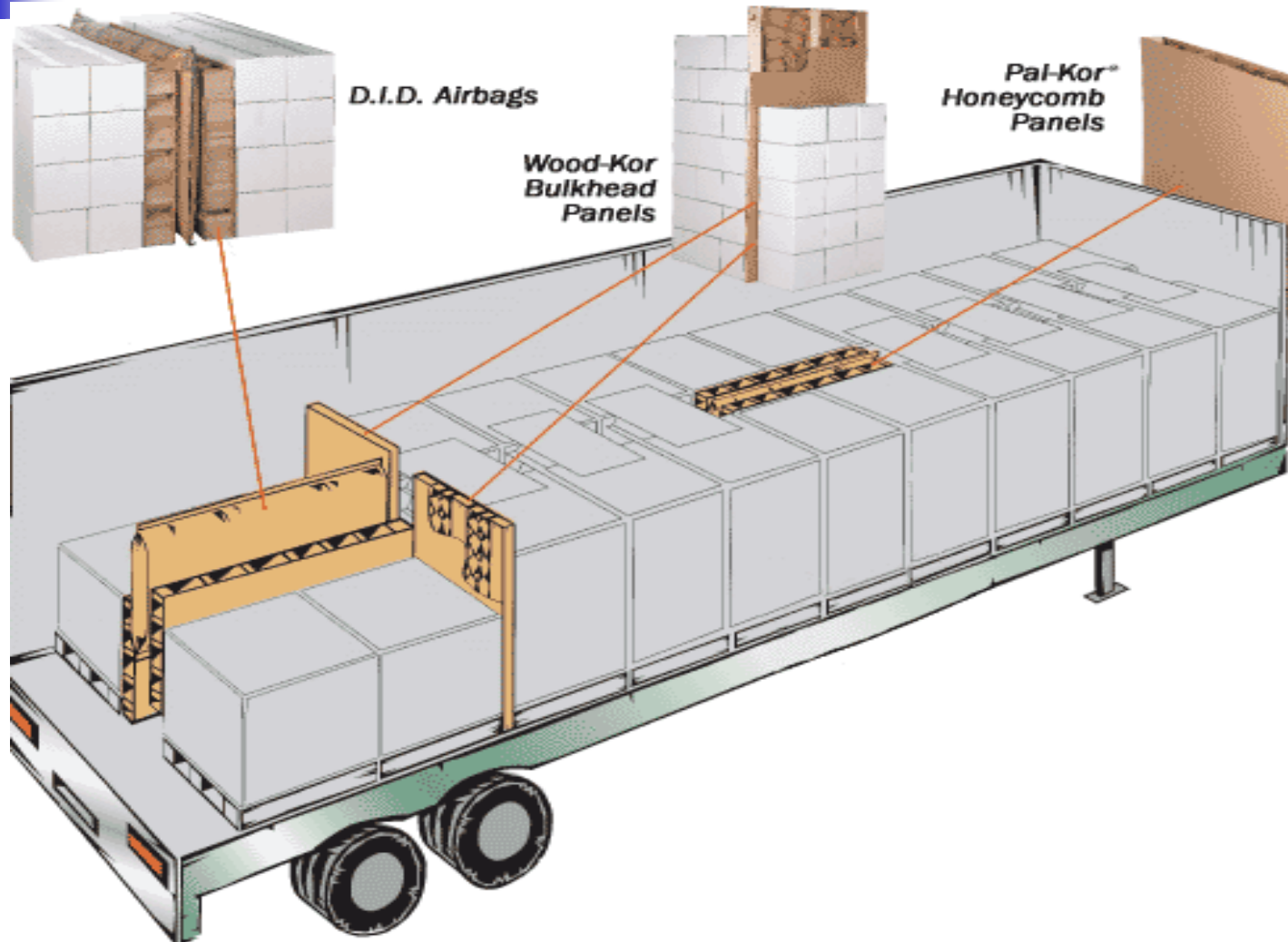


Wood blocking and bracing

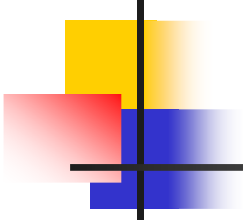


**Not acceptable by American Association of Railroads (AAR)
for "step ups" and "step downs"**

When your load requires “step ups” or step downs”.
You can use a Wood-Kor Bulkhead to securely
brace your product and prevent movement.



Common load securement devices.



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.

Common load securement devices.

Strapping and Lashing

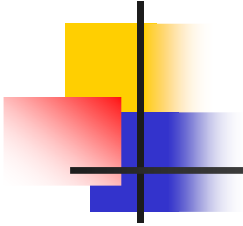


Straps are used to unitize 4 IBC's in combination with friction mats.



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

Common load securement devices.



Rubber Friction Mats

PROS

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

Cons

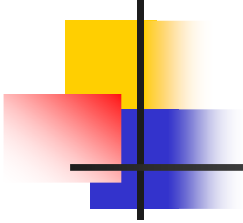
- Usually Requires Additional Securement Method
- Does not work well for tall units or double stacks, due to tipping



Rubber Friction mats.



Common load securement devices.



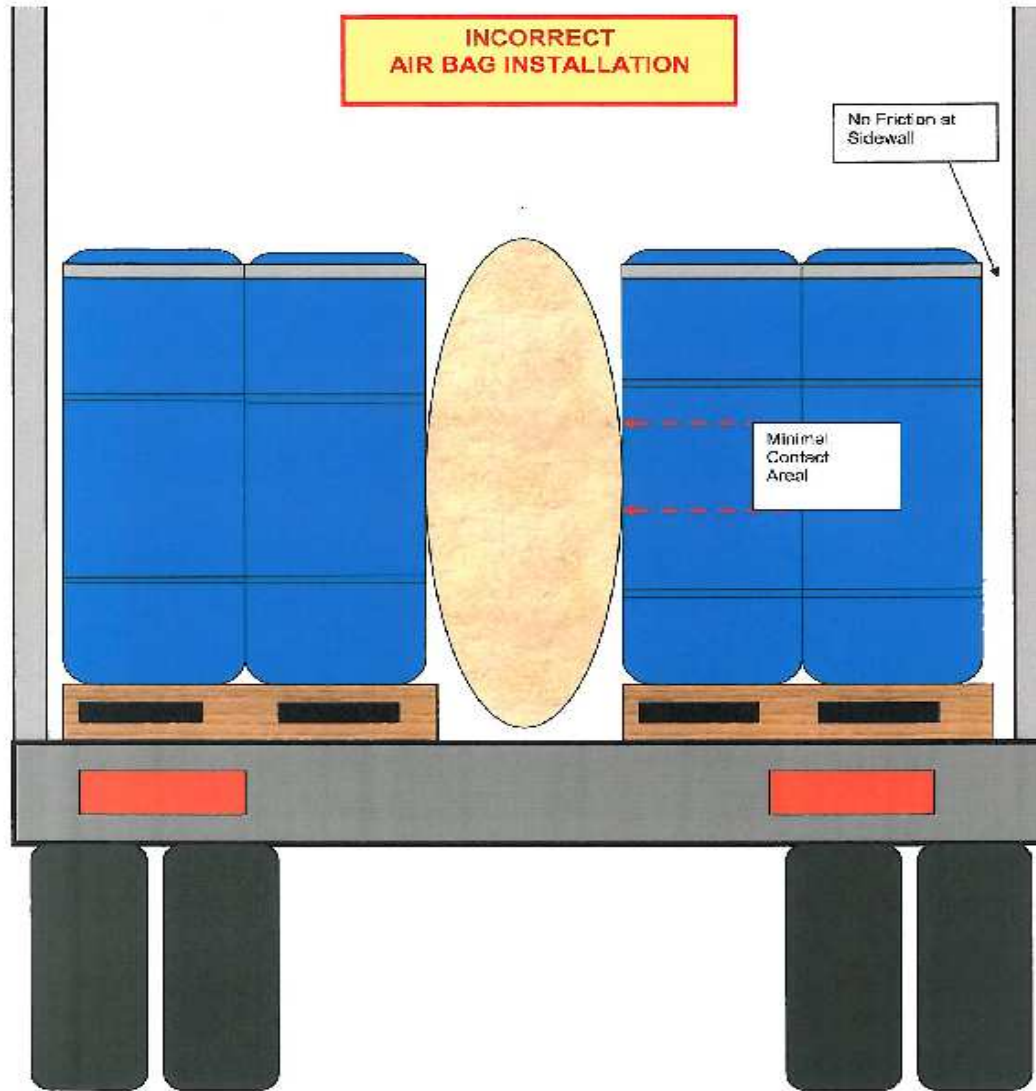
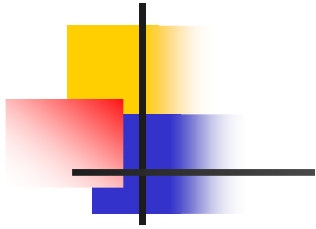
Dunnage Air Bags

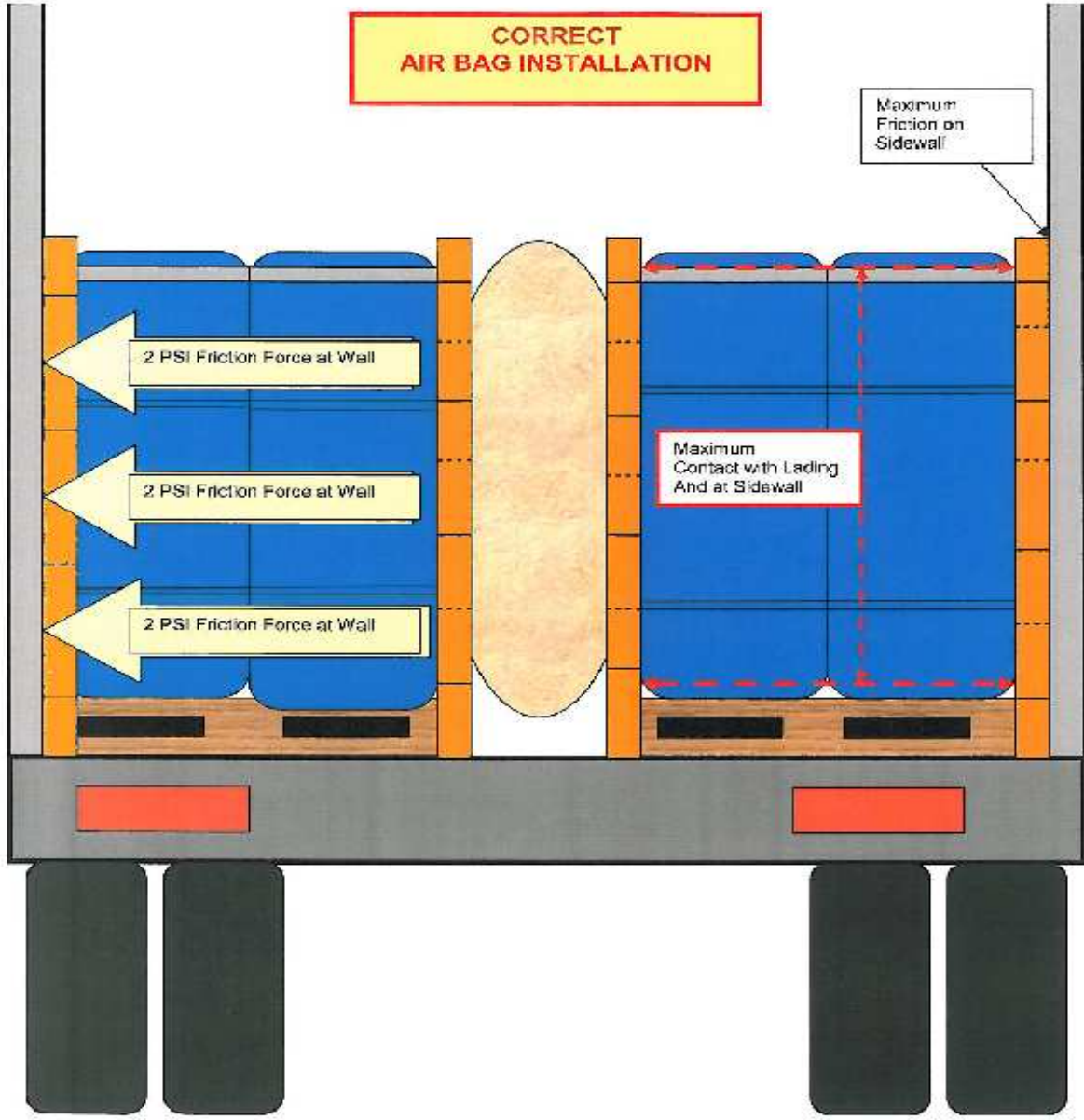
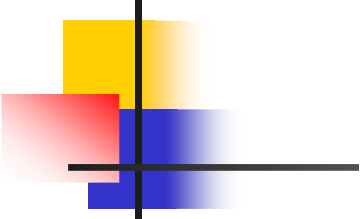
PROS

- 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





Common load securement devices.

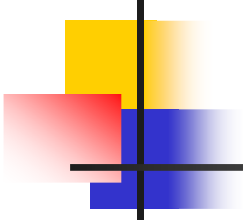
Dunnage Airbags



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.

Common load securement devices.



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.

Common load securement devices.

Corrugated Void Fillers

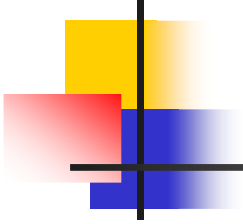
Honeycomb Panel



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



Common load securement devices.



Corrugated Bulk Head Systems

PROS

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

CONS

- Cost
- Difficult to handle

Common load securement devices.

Corrugated Bulk Head Systems

M-Frame bulk head system

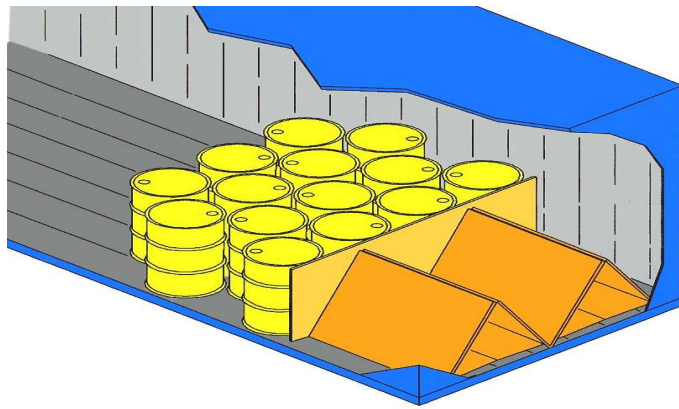


Load & lock

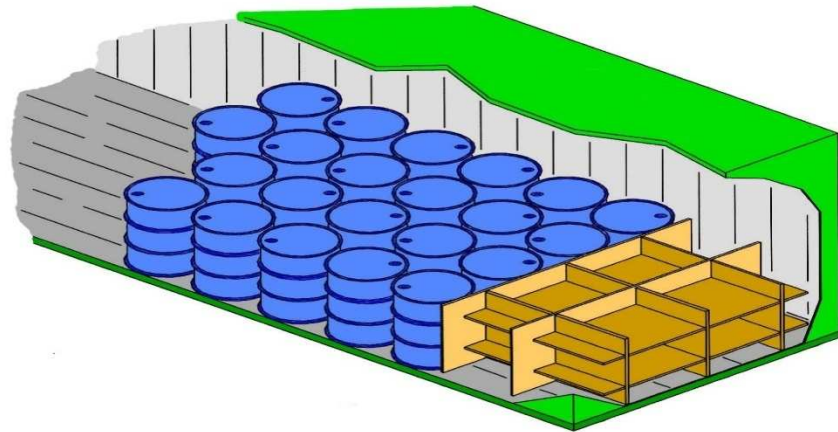


Common load securement devices.

Corrugated Bulk Head Systems



M-Frame bulk head



Load & Lock bulk head



Common load securement devices.

16" Poly Banding

PROS

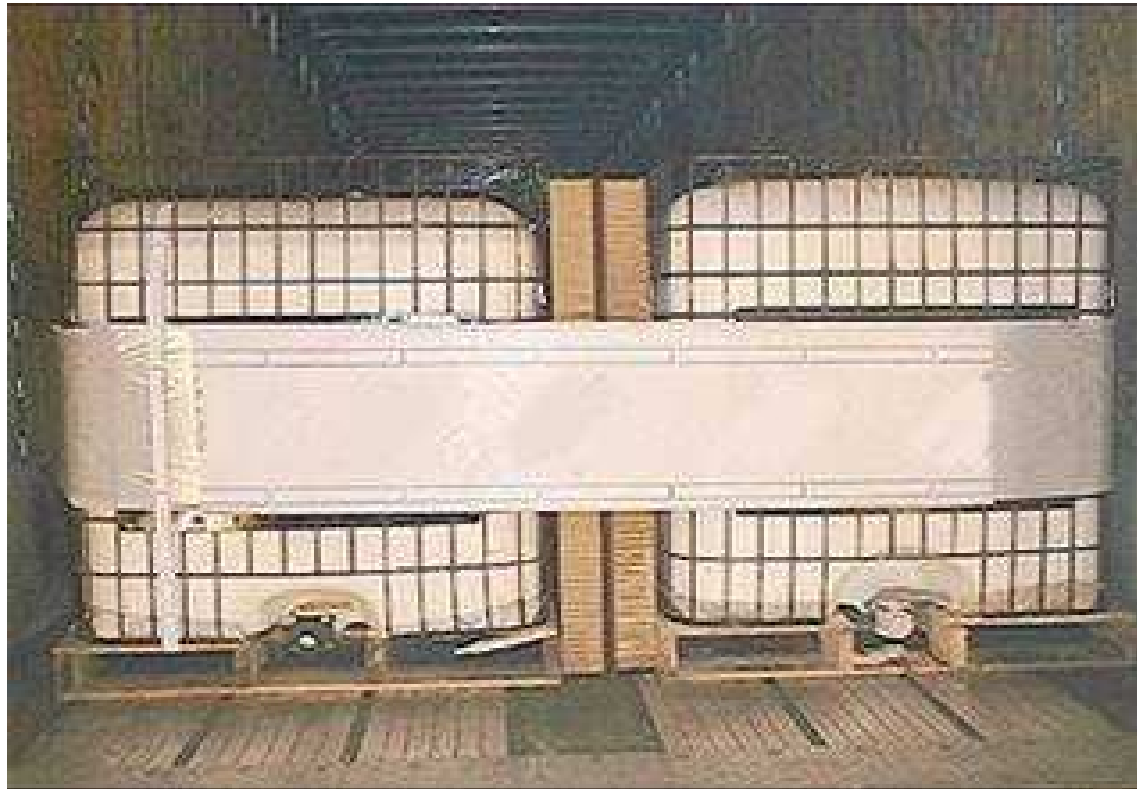
- AAR Hazmat Approvals
- Works well with contoured packaging (Drums, pails, IBC's)

Cons

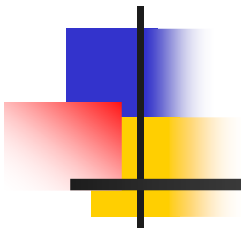
- Cost
- Labor Intensive
- Restricts lading movement in one direction only
- Can fall down if not taped

Common load securement devices.

16" Poly Banding

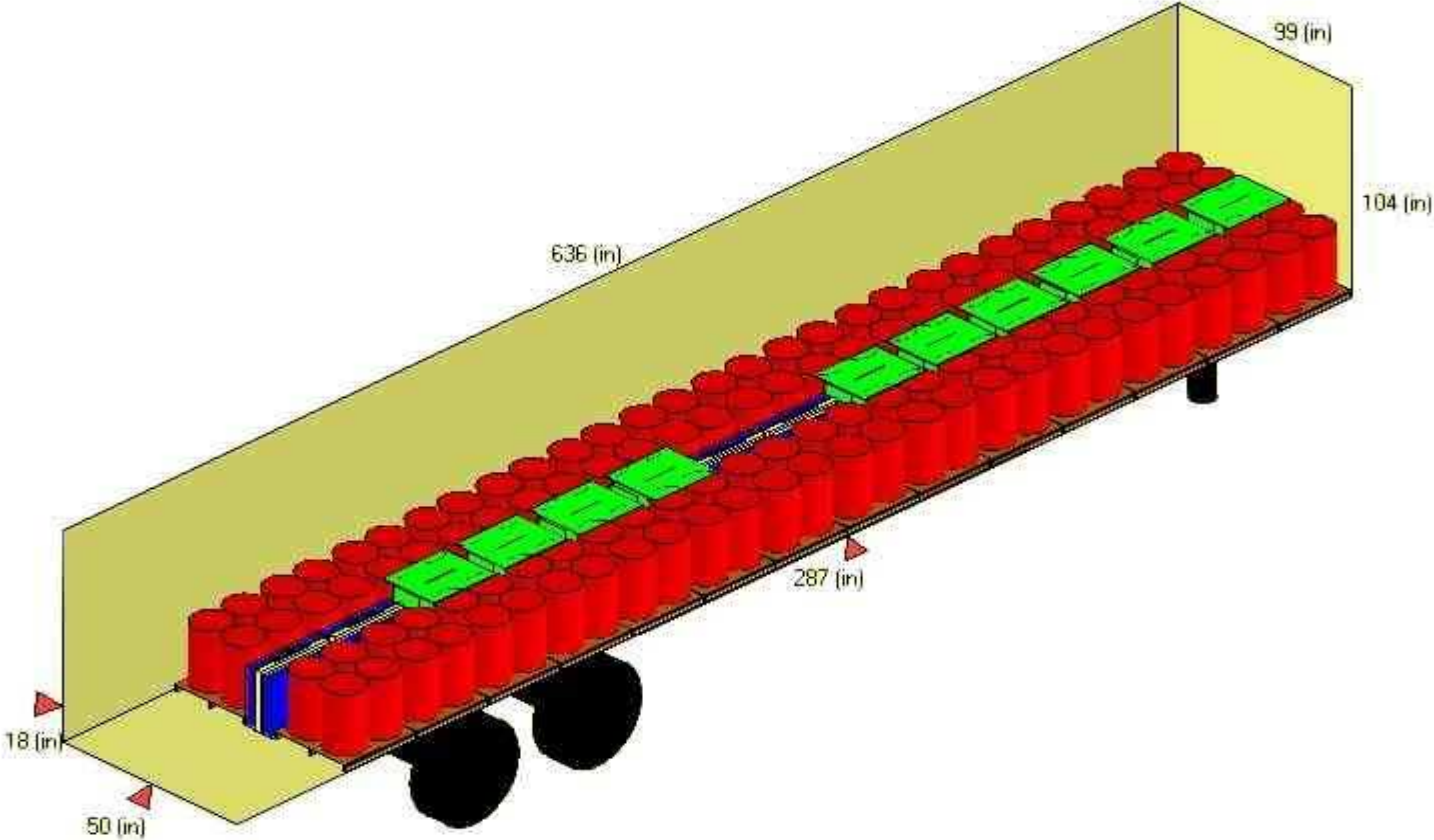
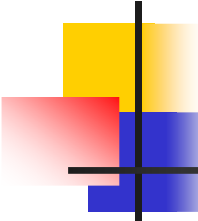


Load Securement Systems

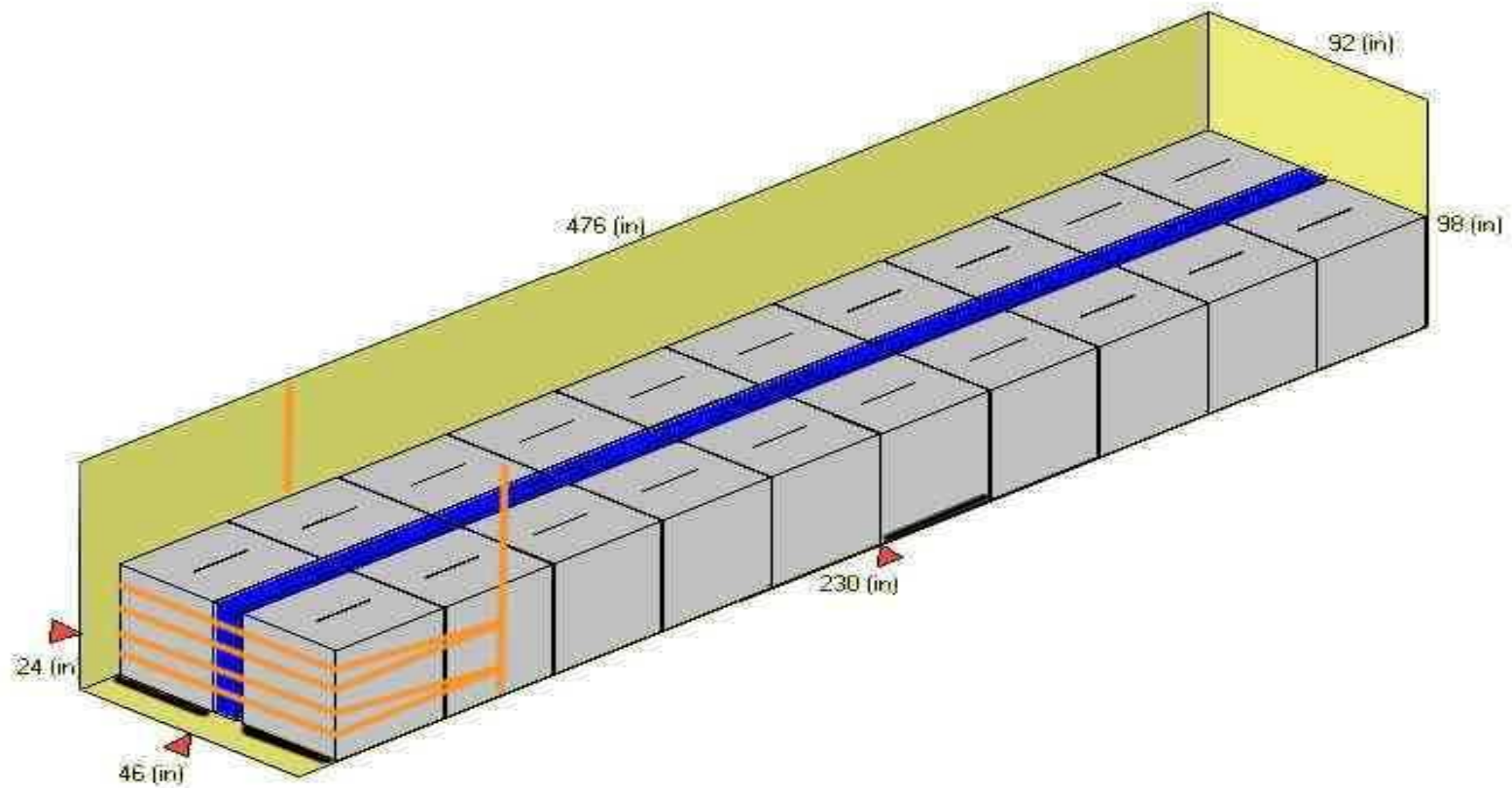


A “Load Securement Systems” is several load securement devices and or methods used to secure an entire cargo load during transit.

System-Airbags w/ Void Filler

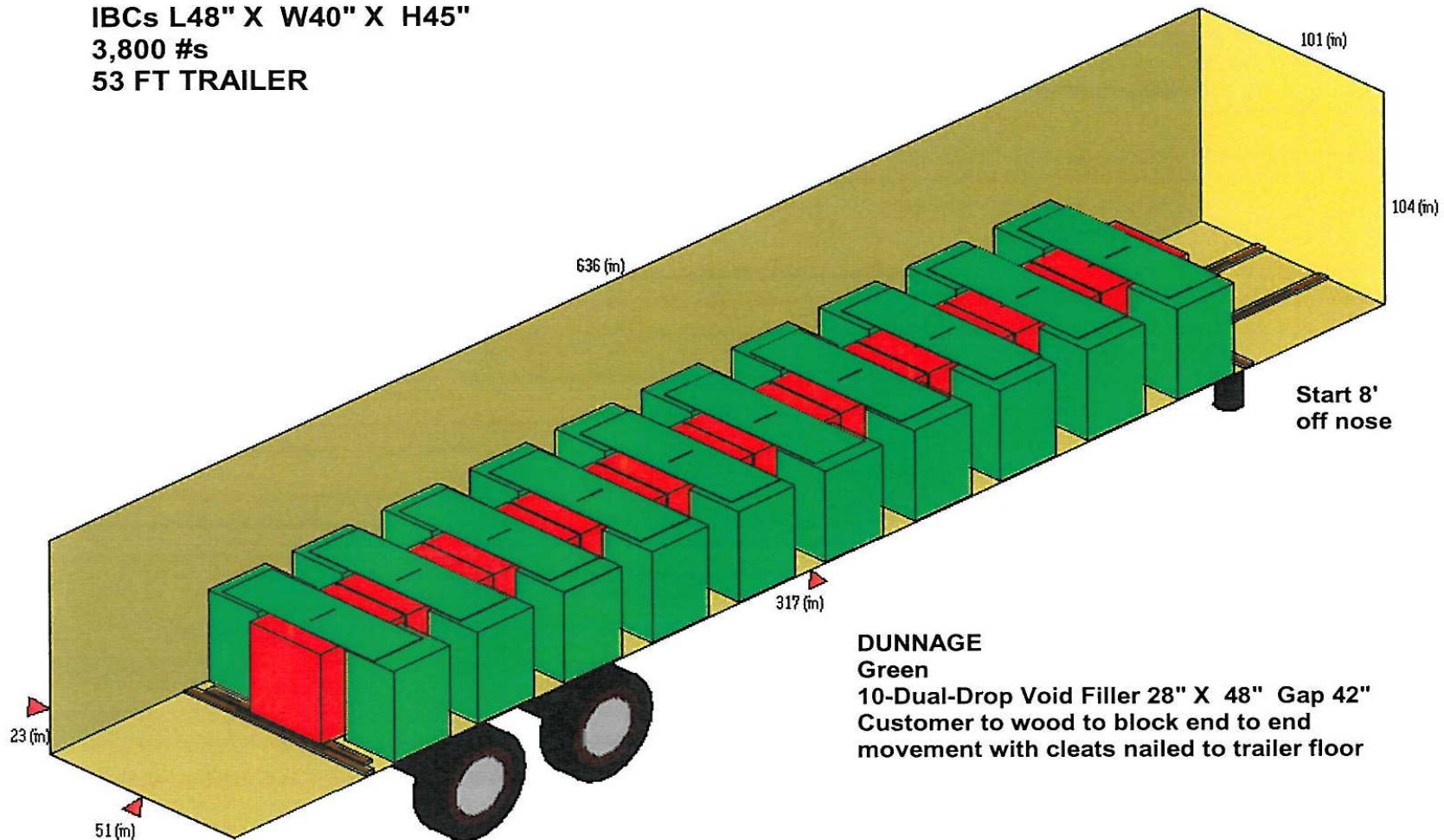


System-Strapping with Friction mats and void fillers

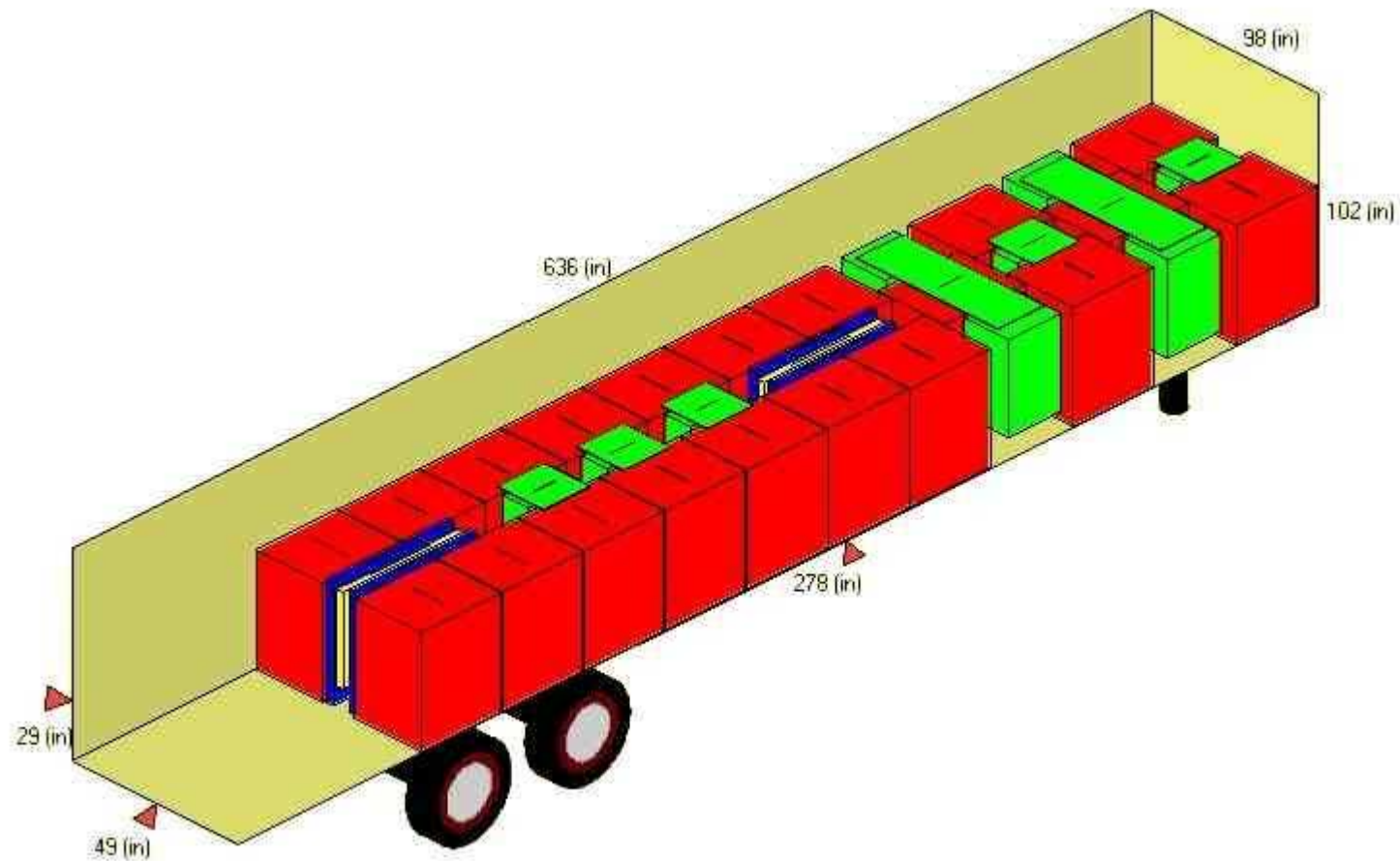


System where the weight of the lading is such that the weight limitation of the trailer is reached before the volume of the trailer is filled. This system uses Void fillers and wood blocking.

IBCs L48" X W40" X H45"
3,800 #s
53 FT TRAILER



System- Combination of Void filler with Air bags.





There is More Than One Way to Secure Your Cargo

The important thing is Secure Your Cargo.

If you have question, please consult:

- **A Load Securement Professional**
 - **Load Securement and Damage Prevention Companies.**
 - **Class 1 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>



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 5 locations in North America.

**Contact: Tammy Drumheller, at
tdrumheller@itwdownriver.com (770) 554-2665.**



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