



Kansas City Southern Railway

Intermodal Guide

Rev 01/12/2012

Kansas City, MO
(816)-983-1825

Houston, TX
(281)-465-7190

Shreveport, LA
(318)-676-6133

Index

Preface	
Safety	
Section I.	4
<u>General Information</u>	
Section II.	5
<u>Discussion of Rail Transportation Forces</u>	
Section III.	8
<u>Rigid Versus Semi-Floating Load Plans</u>	
Section IV.	8
<u>Shipper Requirements</u>	
Equipment Inspection	10
Determining if Repairs are Improper	11
Patches	12
Top and Bottom Rails	13
Maximum Weights for Trailers, Containers and ISO Tanks	14
Limitations to Achieving Maximum Load Factor	15
Section V.	16
<u>General Rules for Blocking/Bracing Freight for Trailer on Flatcar, (TOFC)/Container on Flatcar, (COFC) Service</u>	
Section VI.	17
<u>Materials and Techniques for Blocking/Bracing Freight</u>	
Pneumatic Dunnage - Air Bags or Disposable Inflatable Dunnage (D.I.D.)Bags	17
Skids	20
Palletized Commodities	22
Rubber Mat	22
Section VII.	23
<u>Forbidden Commodities</u>	
Appendix A	25
<u>Association of American Railroads Approved Intermodal Load Plans</u>	
<u>List of Other Publications Governing Rail Intermodal Shipments</u>	29



Preface

The Kansas City Southern Railway, (KCS) **Intermodal Guide** is designed to be a resource for our intermodal customers complementing the publications of the Association of American Railroads. In addition to documenting KCS's requirements for the safe and damage free transportation of freight in intermodal service, this guide also contains industry best practices gathered by the Kansas City Southern Damage Prevention group. This intermodal guide is presented as a demonstration

of the KCS Damage Prevention Group's commitment to add value for our customers by assisting in the development of efficient and economical load plans that facilitate the safe and damage free transportation and delivery of intermodal freight. This guide is not a complete reference to intermodal load design, and is intended to be a supplement to other pertinent laws and industry publications some of which are listed in appendix A of this guide.

Safety

Opening trailer and container doors is dangerous! Always assume the load has shifted to the rear, and is applying pressure to the doors. When door latches under pressure are opened, they will spring out from the pressure violently, and doors will abruptly open with force, and lading may fall out of the trailer or container. Stand clear of the area immediately adjacent to the rear of the trailer or container in case the

doors swings open and/or lading falls out. Personnel opening doors should stand clear to prevent the door from striking the body, and safeguard against door latches striking hands, arms or knuckles. Personnel should use personal protection equipment and door safety harnesses to mitigate the danger. Conduct a job briefing before opening doors, and anticipate the doors popping open violently.

Section I. General Information

Information relating to load planning and blocking and bracing of freight for intermodal service can be found in Circular 43-D, *Rules Governing the Loading, Blocking and Bracing of Freight in Closed Trailers and Containers for TOFC/COFC Service*, Railinc, © 2001. Circular 43-D can be found in Section II of the Association of American Railroads, (AAR) Intermodal Loading Guide. A copy of the Intermodal Loading Guide can be ordered online at www.railinc.com. The rules found in the Intermodal Loading Guide apply to shipments in the US, Canada, and Mexico.

The Intermodal Loading Guide contains general rules in Circular 43-D for blocking and bracing freight. The general rules require voids to be filled lengthwise and crosswise of the trailer or container with appropriate blocking, bracing and void-filling material – see *Materials & Techniques for Blocking and Bracing Freight* in

this guide. There are several Association of American Railroads approved loading methods for specific commodities contained in the Intermodal Loading Guide.

Freight for which there is not an approved loading method must adhere to the general rules for blocking and bracing contained in section III of the Intermodal Loading Guide, and are subject to individual carrier restrictions for all rail carriers over the route the intermodal shipment will move. Shippers must meet the most restrictive carrier requirements off all carriers in the route of the shipment. The KCS Intermodal Guide is also governed by Title 49, United States Code.

For assistance developing load plans for specific commodities, contact the Kansas City Southern Damage Prevention Group at:

KCSRFreightClaims@kcsouthern.com

Section II. Discussion of Rail Transportation Forces

Forces exerted on lading are the result of acceleration or deceleration of a trailer or container. Deceleration is acceleration in an opposite direction. Force is a function of mass, ***m*** and acceleration, ***a***: ***F = m a***. Acceleration is inversely proportional to the time it takes to change from one speed to another. Acceleration of lading occurs

in rail transit as a result of coupling (switching under power or gravity classification) or draft or buff forces due to the careful handling by the train engineer, the terrain over which the train is moving, or the length of the train and location in the consist of a particular load.

Acceleration is defined as a change in velocity over a specific time period:

$$a = \frac{\Delta V}{\Delta t} \quad , \text{ or } \quad \frac{V_1 - V_2}{t_1 - t_2} \quad \text{where } V = \text{velocity, } t = \text{time, and } a = \text{acceleration}$$

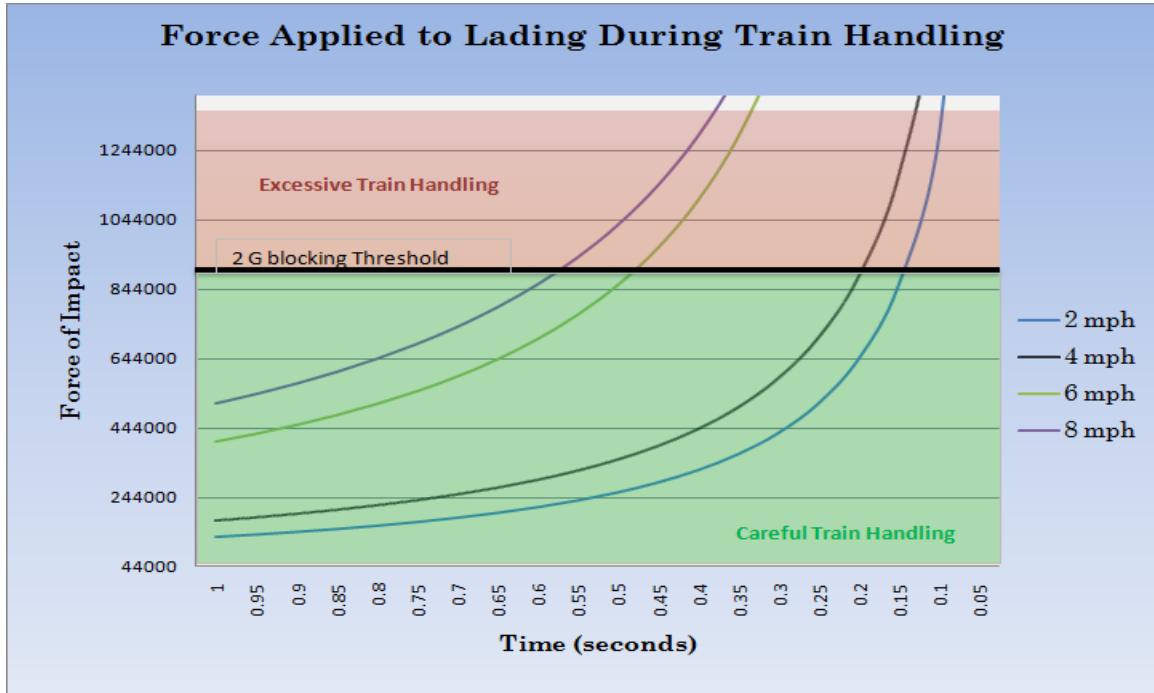
A change in velocity, ***V₂ - V₁*** (the first observed velocity minus the second observed velocity in a given time interval, ***t₂ - t₁*** is the acceleration over that time interval.

The **Force, *F*** exerted on the lading as a result of acceleration is equal to the mass of the lading (weight in lbs for our purpose) times the acceleration:

$$F = m * a, \text{ or by substitution, } F = m * \Delta V / \Delta t$$

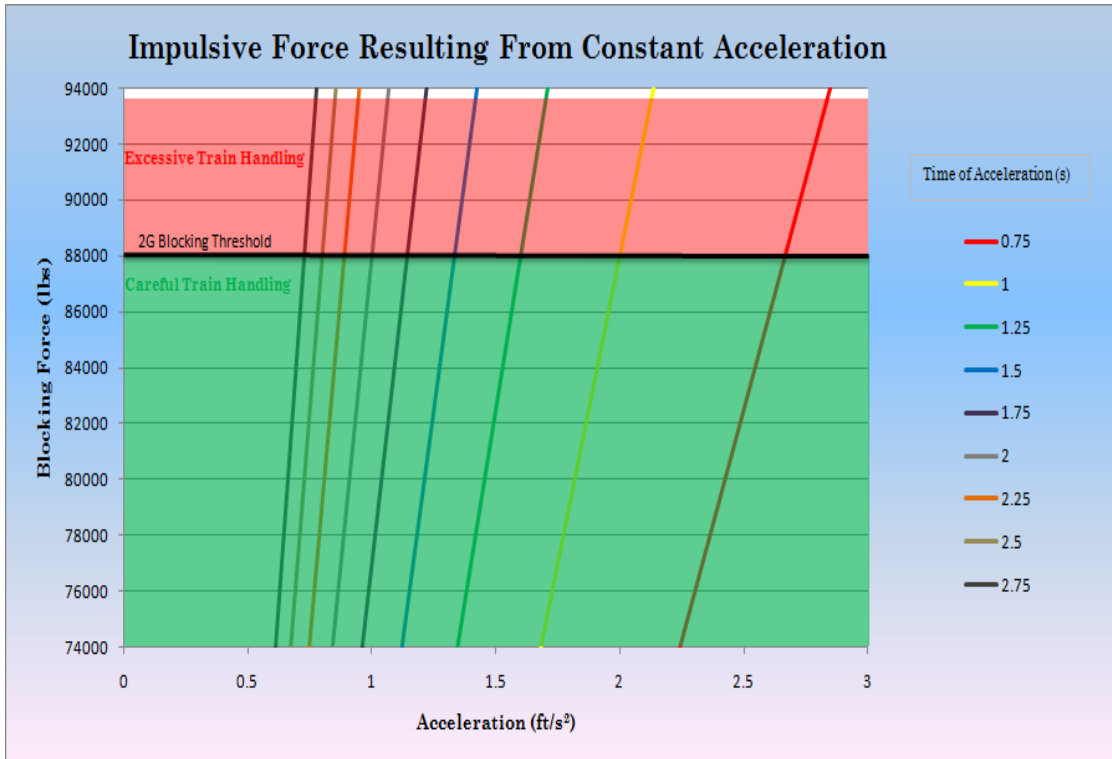
We can consider the effect of the time the force is applied to the lading by limiting the time interval to zero, *lim* $\Delta t \rightarrow 0 / F$. Logically, the larger the divisor of the equation, Δt the smaller the result, or the longer it takes a trailer or container to change speeds, the less force is experienced by the lading. As Δt approaches an infinitely small number, the larger the resulting force on the lading.

The chart below, “Force Applied to Lading During Train Handling” illustrates that the blocking force required to block lading is dependent on the amount of time the force is exerted on the lading, not only the velocity of the lading at impact. The limit of the force exerted as the time interval approaches zero (instantaneous acceleration or deceleration) is infinitely high.



Force applied to lading at constant acceleration for a period of time such as occurs during from excessive train braking or acceleration for an excessive time period is referred to as **impulse**. Impulse is the

degree of force multiplied by the time that force bears on the lading. The chart below indicates 44,000 lbs of lading can be accelerated at about .6 ft/s² for 2.75 seconds without exceeding a 2G blocking requirement.



This discussion of forces experienced by lading in rail transit emphasizes the requirement to fill all lengthwise and crosswise voids in order to unitize freight. Unitizing freight and filling all voids allows for the even distribution of rail transportation forces. Cushioning devices and careful handling dampens impacts to unitized lading by reducing acceleration during

coupling and lengthening the time of impacts to trailers and containers. Lading shifting inside a trailer or container experiences force without the limiting effect of careful handling or cushioning devices when the unblocked lading shifts into other lading or the body of the container that cannot move.

Section III. Rigid versus Semi-floating Load Plans

Rigid load plans are load plans having all voids filled thereby illuminating the effect of inertia within the load and evenly distributing transportation forces though the load. These loads typically unitize freight in trailers and containers with air bags at either end of the trailer or container, floor blocking, or other means to prevent the shifting of lading within trailers or containers. *Semi-floating load plans*

typically use rubber mat and/or unitizing bands and/or runners to allow the load to “float” as a unit in transit. Rigid load plans do not allow any movement of lading within the trailer or container. Floating load plans are designed to allow for minimal movement while maintaining equal weight distribution of the load within the trailer or container.

Rigid Loads

Rigid loads should conform to an approved load plan of the Intermodal Loading Guide, or be approved by the KCS Damage Prevention Group. These loads use corrugated void filler, wood, steel strap, gates, bull boards or other means of blocking freight in intermodal service to fill all voids and protect the doors of the trailer or

container. Note the requirement at the bottom of illustration 10 below that trailer doors be protected without documenting the specific nature of the doorway protection required. The method for doorway protection varies with the commodity weight, packaging, and equipment used.

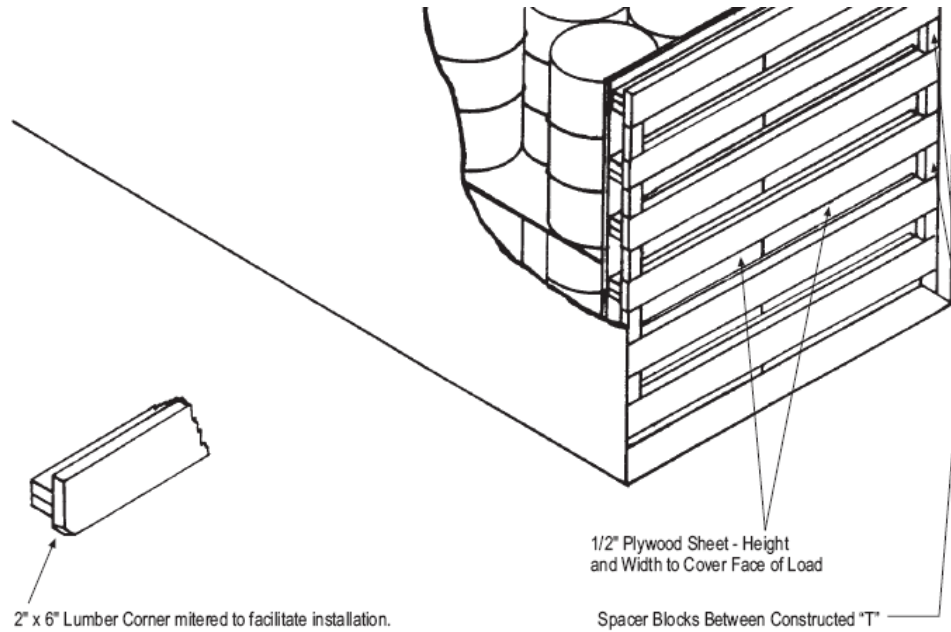


Illustration No. 81
 Method G-2
 Double Layer Drum Load Secured with "T" Gates in a 20' Container

KCS requires lading to be blocked and braced sufficiently to prevent the lading from shifting during rail transit. Blocking must consist of materials or techniques that block sufficiently while allowing for the safe unloading of trailers and containers at destination. Generally, the minimum required amount of blocking force must be sufficient to hold twice the total weight of the lading, (2G) for rigid load plans. This minimum standard is adapted from the AAR Open Top Loading Rules Manual, (OTLR) minimum lateral load restraint value listed in table 5.1 on

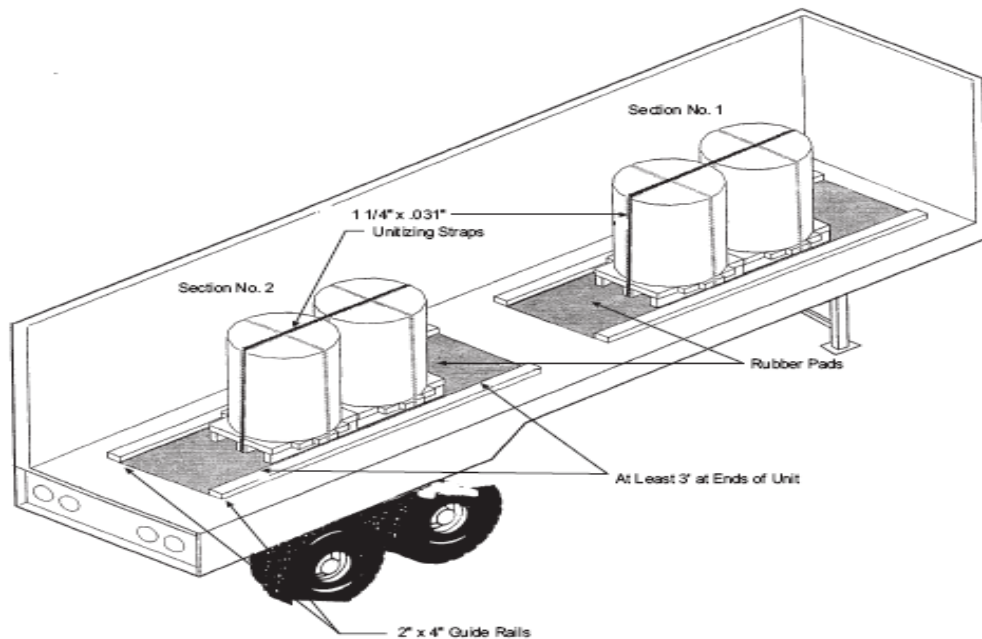
page 9 of the OTLR manual and is consistent with the blocking applied to approved rigid load plans such as method G-2 of the Intermodal Loading Guide. Since the minimum blocking force required for rigid load plans will depend on the density, coefficient of friction and other aspects of the lading, the 2G should be considered to be a minimum standard for load design for testing purposes. *KCS may require a shipper to include additional blocking for loads experiencing a higher than anticipated exception rate.*

Semi Floating Loads

Semi-floating loads for intermodal service typically include lading resting on rubber mat within some type of restraint device such as runners or unitizing bands to maintain equal weight distribution of the load as a part of the blocking system. In addition to rubber mat, other aspects of a semi-floating load blocking system may include unitizing strap(s), voids, load anchors, etc. The weight of the lading (or the weight of the group of lading within the unitizing strap) and their coefficient of friction between them and rubber mat together with the other aspects or devices comprise the blocking system. The correct

application of the rubber mat, the correct application of the unitizing strap, and the appropriate void at the doors based on the approved method is critical to the success of a semi-floating load plan.

Below is an example of a semi-floating load plan. The illustration is from the approved method E-2. Note the unitizing band securing two coils in order to meet the 2G minimum blocking requirement with a minimum co-efficient of friction of rubber mat of 0.1.



Intermodal Loading Guide, Association of American Railroads, Illustration #63 "Coils on Skids with Rubber Mats on Floor (Hardwood Flooring); pp 4-39

Section IV. Shipper Requirements

As a transportation company, KCS focuses its efforts on the safe, efficient and damage free transportation of freight over the railroad. Proper loading of freight prerequisite to the safe, efficient and damage free transportation of freight is required of shippers.

Equipment Inspection

It is the shipper's responsibility to select equipment strong enough to support the lading, and to inspect equipment for defects prior to loading. Damaged or defective equipment should be rejected by shippers. In the event a shipper elects to load defective or damaged equipment for rail transport, it will be the shipper's responsibility to transfer lading from damaged or defective equipment in the event of failure, or at the request of the KCS Damage Prevention group in order to facilitate the safe and damage discovered the damage or defect of the equipment.

A competent inspection will involve visual inspection of nail-able floors and side walls for protrusions that will damage lading, inspection of interior roofs, patches and seams for missing rivets, caulk, or leaks, and inspecting top and bottom rails both inside and out for damage or improper repair.

Common equipment defects include holes in roof, improper patches, or damaged or improperly repaired rails.

free shipment of the lading. *Loss or damage to lading that is the result of defective equipment shall be the liability of the shipper even if the equipment is owned and/or provided by a railroad for loading.* The standard for determining to reject, rather than load damaged or defective equipment will be determined by the KCS Damage Prevention Group based on its sole determination that a reasonably competent inspection would have

Improper rail splicing or damage to rails as a result of roof or side panel patching, or shifting of lading within a trailer or container when loaded or unloaded by side-lift cranes typically results in total failure of intermodal equipment during rail transit, and therefore require special attention both inside and out during equipment inspection in order to reject damaged or improperly repaired trailers and containers.

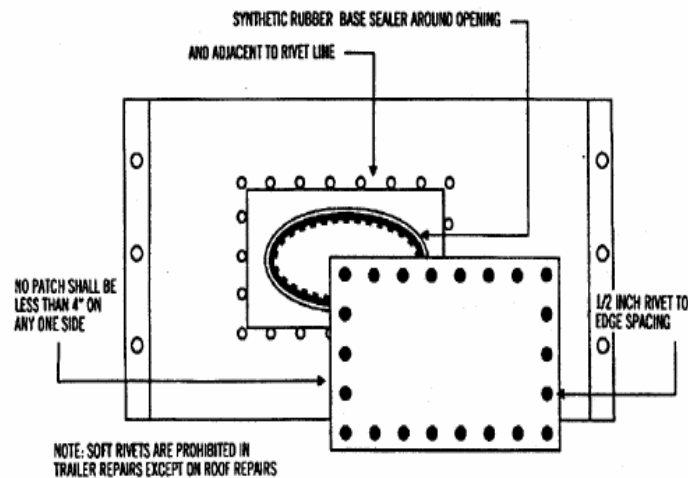
Best Practice for Trailer/Container Inspection

Inspect top and bottom rails inside and out. Pay special attention to areas previously repaired. Reject damaged or defective trailers and containers. Inspect floors and walls for protrusions, and ensure equipment is of suitable strength to support the lading being shipped.

Determining if Trailer Repairs are Improper

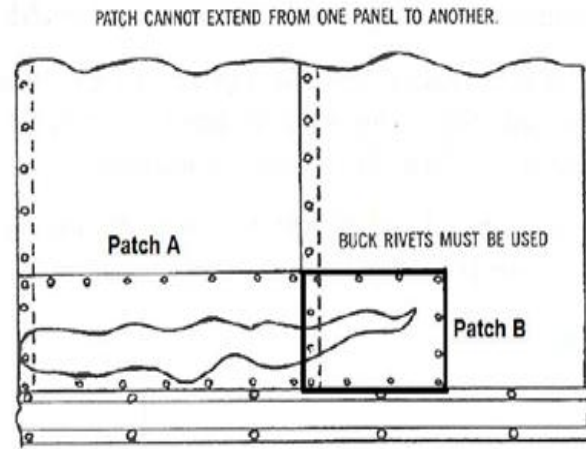
Patches

A correctly applied patch will consist of like material no less than 4" on all sides with rivets $\frac{1}{2}$ " from the edge of the patch and 1 $\frac{1}{2}$ " rivets on center.



Intermodal Interchange Rules Including Billing and Repair Procedures, Association of American Railroads, Effective January 1, 2007; Fig. B-1, pp-62.

Patches cannot extend across panels.

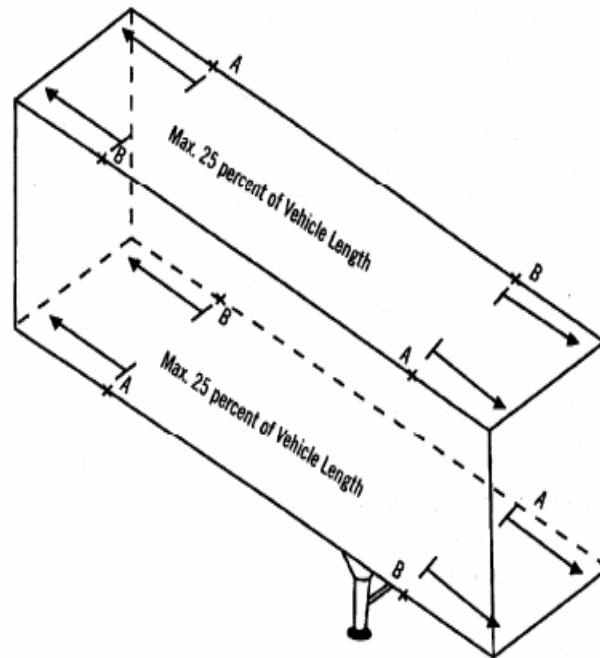


Intermodal Interchange Rules Including Billing and Repair Procedures, Association of American Railroads, Effective January 1, 2007; Figure B-1a, pp 63

Top and Bottom Rail Repairs

Top and bottom rails cannot be spliced from either end past ¼ the length (stacking posts) of the unit. Not more than one splice on either side *and* either end is permitted. ***Improper repairs to intermodal trailer or container rails result in complete failure of the vessel during rail transport.***

"RULE OF THUMB" FOR TRAILER SPLICING



If splice(s) exist(s) at any A location, then splice is permitted at any other A location(s). If splice(s) exist(s) at any B location, then splice is permitted at any other B location(s). Neither A location may be spliced if either B location on the same side is spliced. Neither B location may be spliced if either A location on the same side is spliced.

NOTE: No more than one splice section of rail is permitted in any top or bottom rail, except stretch trailers.

Intermodal Interchange Rules Including Billing and Repair Procedures, Association of American Railroads, Effective January 1, 2007; Figure B10, pp 83



Roof patch repair damages top rail plainly visible from inside the unit.



Complete failure of the same intermodal box in transit

Maximum Total Weight

Maximum Total Weight for *Intermodal Trailers* – 65,000 lbs. excluding metal or wire coils. Metal coils including wire coils maximum allowed weight is 58,000 lbs.

Maximum total weight for *intermodal trailers and lading* is the lesser of the maximum weight listed on the manufacturer’s plate for lading or a total weight of **65,000 lbs.**

Maximum Total Weight for *Intermodal Containers*

Maximum total weights for *containers* are restricted to the lesser of the maximum weight listed on the equipment manufacturer’s plate, or the maximum gross weight listed in the **table below.**

Nominal Length (ft.)	Maximum Gross Weight (lbs.)** (Lading Plus Tare)
53'	67,200
48'	67,200
45'	67,200
40'	67,200
20'	52,900

Circular 43-D, Intermodal Loading Guide, Railinc, ©2001, chart pp 3.

***ISO Tanks* – 58,000 Pounds**

ISO Tanks are handled as intermodal freight subject to rail car weight limitations and the Open Top Loading Rules. While they are handled in intermodal service, they are not subject to the weight limitations of trailers and containers listed in the above table of the Intermodal Loading Guide.



Limitations to Achieving Maximum Load Factor

Intermodal trailers and containers must have weight evenly distributed both lengthwise and crosswise of the trailer or container while keeping the center of gravity of the loaded trailer or container no more than 98” above rail. No more than 2,500 lbs may be distributed over any one linear foot.

Metal coils and wire coils are restricted to 58,000 lbs. These requirements and restrictions may prevent a trailer or container from being fully loaded if a full load cannot be achieved within these weight distribution and center of gravity requirements.

Section V. General Rules for Blocking & Bracing Freight for Trailer on Flat Car, (TOFC)/Container on Flat Car Service

Lading shipped in intermodal service will experience forces in the forward, backward, and side-to-side direction during normal train handling. The effect of voids in intermodal loads is to unevenly distribute normal train handling forces in transit resulting in damage to equipment and/or lading. The lading in an intermodal load having voids typically cannot withstand normal handling forces unevenly distributed through the lading. Damage occurs due to the forces imparted by lading behind or to the side shifting through voids and into the lading adjacent those voids.

We refer to this action as the “jack-hammer” effect on the lading.

There are several blocking and bracing materials, (dunnage) available that allow for the filling of all voids, and loading the length of a trailer or container -mostly rigid blocking applications, and a combination of void with rubber mat and/or unitizing bands, or runners -semi-floating load plans, that require a void at trailer or container doors as one aspect of a semi-floating load blocking system. The general rules require all voids to be blocked or braced.

Best Practices for Blocking and Bracing Freight

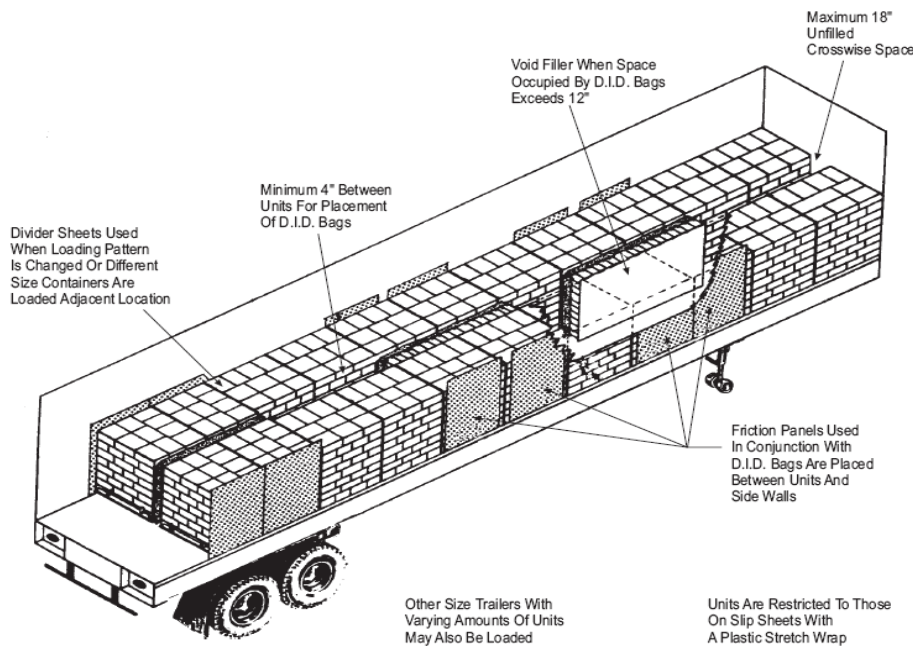
Fill all voids lengthwise and crosswise. Unitize freight in order to evenly distribute forces through the load.

Pneumatic Dunnage, Air Bags, Disposable Inflatable Dunnags, (D.I.D) Bags

Disposable, inflatable dunnage bags, (D.I.D.) also known as air bags in loads of palletized case goods for intermodal service use air bags between palletized units of lading to push the palletized product against side walls of intermodal trailers effectively unitizing the load and

providing lengthwise blocking.

The friction between the palletized product and the side walls must be sufficient to hold back (block) the load – *see method F-1, Case Goods on Slip Sheets Secured with Friction Panels and D.I.D. Bags in Trailers.*



*Intermodal Loading Guide, Association of American Railroads ©2001;
 Illustration No. 78 pp 4-77*

Common air bag failures include *air bag deflation*, or *air bags becoming displaced* during transit. Air bags fail

due to excess force generated by train handling. Air bags also fail:

- 1) -of their own accord-commonly referred to as “*air bag fails for no apparent reason*” due to a defect in the air bag. Air bag defects are not common; but, they do occur occasionally.
- 2) -when air bags are not protected from pallets (especially in double stacked lading), side walls, or floors and are torn, punctured, or ripped in transit. Air bags should never be loaded in contact with pallets or rough surfaces as the air bags will rub or tear during transit.
- 3) -as the load tightens under the pressure of the airbag. This phenomenon occurs when air bags exert constant force against adjacent lading. The lading tightens throughout the load gradually as it is pushed by the air bag. This load tightening increases the area of void at the air bag location. Even though there is the same amount of air in the bag, the area it occupies becomes larger as the load tightens. The larger area results in less pressure in the air bag resulting in less blocking force in the load. For this reason, air bags should be filled to the appropriate pressure and subsequently *rechecked 30 minutes* after inflation.

Air bag displacement occurs when air bags do not cover a sufficient area of adjacent lading, air bags are placed between different size lading, or when air bags protrude above lading or past the sides of lading.

Imagine a balloon pressed between your hands. If pressure is not applied equally to the same area on both sides of the balloon, the balloon will try to move to the area of least resistance out from between your hands. An air

bag will act the same way in transit during normal train handling.

Air bags also rupture or burst due to *excessive train handling*. From a cause determination and liability point of view, it is appropriate to document the condition of air bags when damage occurs by photographing the location of burst air bags prior to unloading, and after unloading if required to document that the air bag burst as opposed being torn, ripped, gouged, punctured, frayed, or failed for no apparent reason.

Predominantly, Air bag exceptions in intermodal loads tend to result from the following causes:

- 1) Use of incorrect size air bags
- 2) Air bags not sufficiently inflated
- 3) Air bag placement not according to the approved load plan (too few air bags)
- 4) Failure to face air bags with protective material when it is possible for the bag to rub against pallets, floors, or walls.

Best Practices for Air bags in Intermodal Service

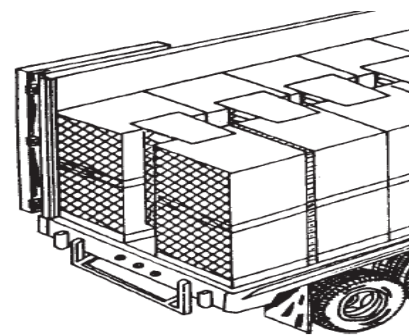
Use air bags of correct size that cover as much of the adjacent lading as possible without protruding into adjacent voids. Face the airbags with protective material to avoid rubbing against rough surfaces. Fill air bags to the correct psi, wait 30 minutes, then recheck/refill the air pressure. Document the placement and condition of air bags in the load when damage occurs.

Using Trailer/Container Doors in a Blocking System

(See Circular 43-D, pp 2-4.)

Trailer and container doors can be used to secure *non-hazardous* loads weighing not more than 40,000 lbs *and* having 60% contact with the area of the doors. No voids are allowed in loads that use the trailer or container doors as blocking. Loads using the trailer or container doors as blocking are typically floor loaded, very light products in square packages or units in flush contact with the rear doors.

There is no general requirement for a 3' void at the rear of trailers or



(Using rear doors for lengthwise blocking)

Intermodal Loading Guide, Association of American Railroads, ©2001; Illustration # 46, pp 3-35

containers. Required doorway voids are a part of a *system for doorway*

protection in specific approved methods. For example, E-14 requires 4' of void at the rear doors. These voids *in conjunction with* the restrictive force of rubber mats in these load plans comprise the system for doorway protection in these specific

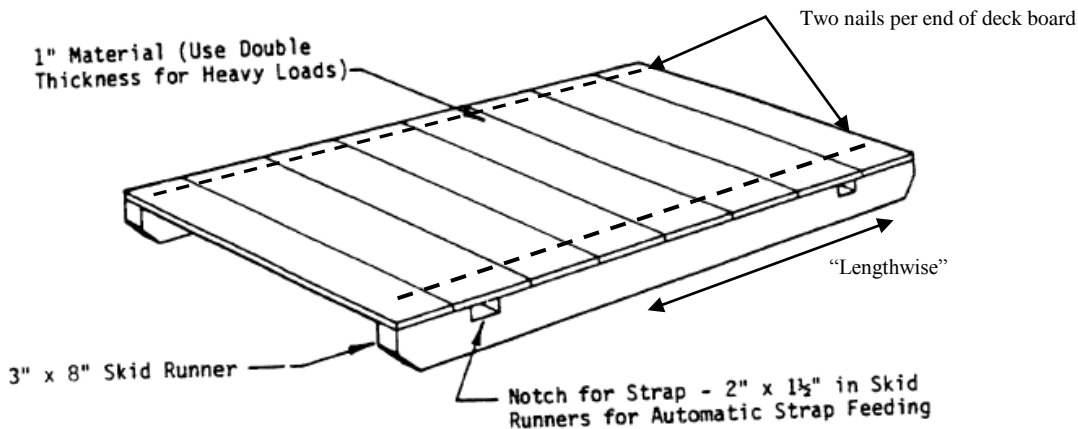
methods. Doorways must be protected for loads not meeting the standard for using the rear doors as blocking listed here. There are several methods of doorway protection that do not require voids.

Skids

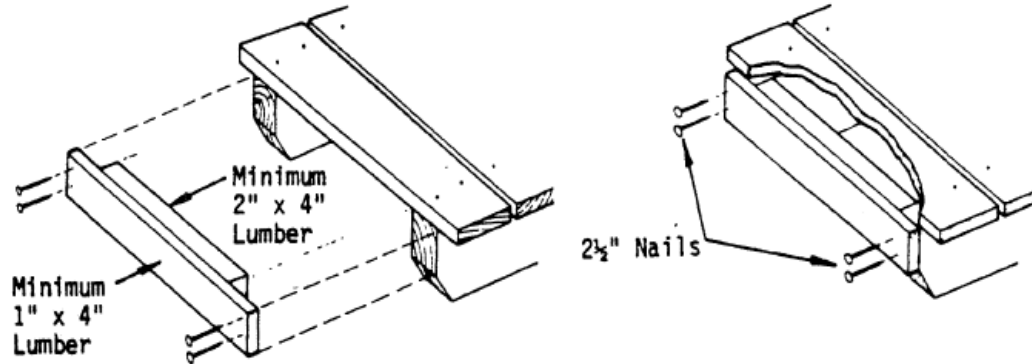
Skids are used to spread concentrated weight over a larger area of the floor of intermodal units in accordance with the requirement that no more than 2500 lbs may be loaded in less than one linear foot of floor. Skids must be constructed of suitable material of sufficient strength to allow for the safe and damage free transportation of the commodity loaded on the skids. A minimum of two nails of appropriate

size must be used on each end of each deck board penetrating at least one third the height of the skid runner. When loaded into trailers or containers, skid runners must be oriented lengthwise of the trailer or container.

Lading that does not fit the length or width of skids must be blocked to ensure the lading cannot shift on the skid.

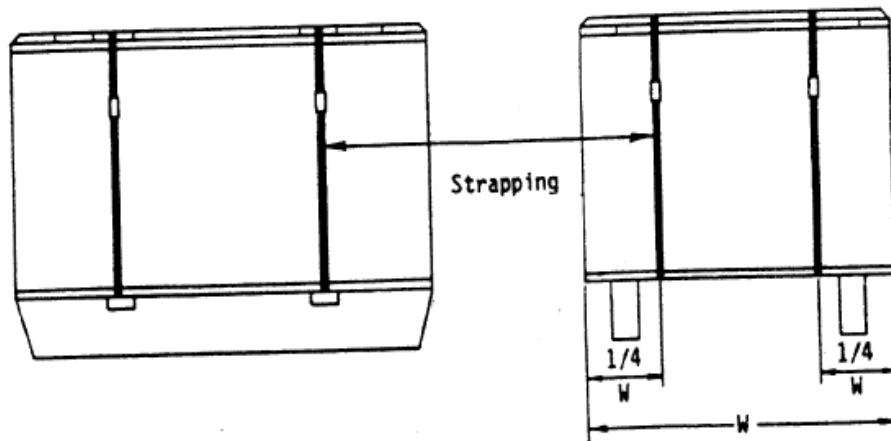


Skid runners less than 3" thick must be reinforced as shown below.

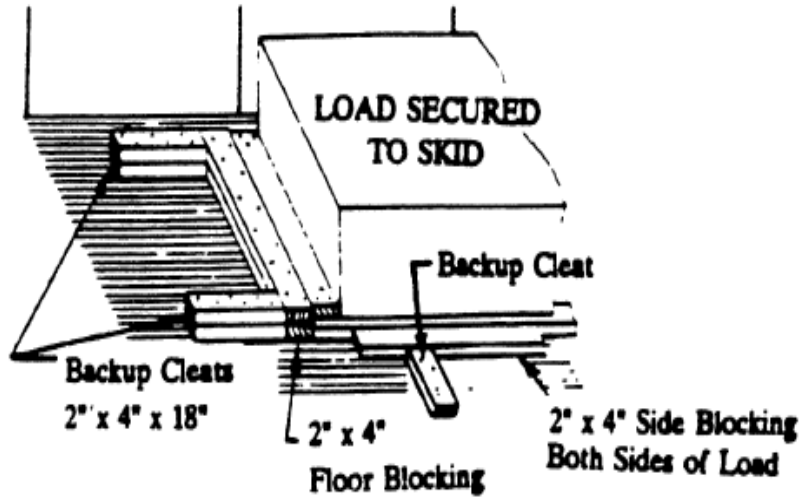


Secure load to skids with lengthwise and crosswise strap of sufficient strength to hold the load in place on the skid. Place strap at 1/4 the width of the skid from ends and sides.

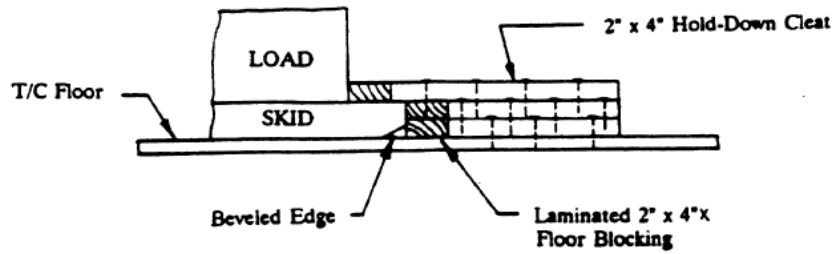
Skids are typically used to distribute weight of metal coils according to approved method E-1 and E-2 on rubber mat braced laterally between runners or guide rails.



← Longitudinal Direction →



← Longitudinal Direction →



Palletized Commodities

Palletized commodities are wrapped to the pallets with shrink wrap. Approved methods include loading pallets against the opposite side walls with friction panels having air bags between pallets-see method F-1, a 2 X 2 offset pattern having equal lateral weight distribution on either side of the trailer with floor blocking and or gate application for doorway protection –see method H-6, or a mixed load of pallets with floor blocking – See methods E-15. Damage

due to load shifting in palletized loads typically occur due to use of incorrect number or size of air bags (substituting smaller air bags than those required), pallet under-hang or pallet over-hang of the commodity on the pallets that result in rubbing or puncturing of the air bag by the pallets in transit, or as a result of product shifting on a pallet where the lading does not cover the entire surface of the pallet.

Section VI. Restricted/Forbidden Commodities

Unless otherwise authorized coins, currency, valuable papers of any kind, precious metals or stones or articles manufactured there from, old rare or precious articles of extraordinary value, or articles liable to damage transportation equipment or other freight will not be accepted for transportation and KCS shall have no liability for loss, damage or theft of these items.

In addition to the above, the following articles will not be accepted for transportation in TOFC and COFC:

- Acids, liquid, in carboys
- Animals, live
- Articles described under Rule 3 of the Uniform Freight Classification
- Articles exceeding inside length of van-type trailer used or articles exceeding length of flat-bed trailer used
- Articles requiring protective service
- Bees
- Blacks (carbon gas or oil blacks), lamp black or vegetable black, dry, NEC, not activated, not dyes or dyestuffs
- Bulk commodities, excluding articles in packages, bundles or units weighing 8 pounds or over, also excluding articles in tank trailers (carriers will not furnish tank trailers) and bulk agricultural commodities shipped in privately owned intermodal equipment (Notes 3 and 4)

- Carcasses, animal, bird, poultry or reptile
- Carrion
- Explosives as described in Classes A and B, Section 173.53 to 173.93 of Tariff BOE 6000
- Fresh meat, packing house products and dressed poultry, as described in Items 67780 to 68010 of UFC 6000 (Note 2)
- Fruits, fresh; or vegetables, fresh or green, as described in Item 40050, 41050 and 41815 to 42220 of UFC 6000
- Missiles, guided, or rockets, guided; guidance system or electronic guidance control apparatus for installation in missiles or in missile sections; missile or rocket from assemblies containing electronic apparatus; or mobile missile guidance systems as described in Items 69093 to 69098 of UFC 6000
- Motor vehicles, freight or passenger or combination of freight or passenger, complete or not complete, finished or not finished
- Radioactive materials
- Railway wheels, new or used, when moving on other than flat bed trailers
- Trailers, freight, or tank trailers, new or used, including freight trailers, noibn, as described in Item 92900 of UFC 6000, but excluding farm or freight cars, trucks or wagons, noibn, as specifically described in Item 92900 and other than as described in Items 93080, 93100 and 93110 of UFC 6000 (Note 1)
- U. S. Mail of any class
- Waste materials: Hazardous, having no reclamation value, as described in Part 1, Title 40, Code of Federal Regulations.

Every party, whether principal or agent, shipping any of the above identified commodities or other explosive or dangerous goods, without full written disclosure to the rail carriers of their nature, shall be liable for and indemnify KCSR against all loss or damages caused by such goods, and such goods may be warehoused at owner's risk and expense or destroyed without compensation to owner. The transportation charges for any such commodities transported by KCSR shall be ten times the highest TOFC/COFC rate in effect between the origin and destination of the shipment.

Note 1: Will not apply on empty tank trailers on which an inbound haul was received.

Note 2: This restriction does not apply on shipments of lard, noibn, shortening as described in Item 67840 of UFC 6000.

Note 3: This RESTRICTION does not apply on shipments of synthetic plastic materials, other than liquids, in plastic liner bags, loaded in dry van trailers subject to the following:

- A. Shipper must furnish and install the plastic liner bag at shipper's expense.
- B. Consignee must remove the empty plastic liner bag after the shipment is unloaded.



- C. Carrier assumes no liability for breakage of the plastic liner bags.
- D. Carrier assumes no responsibility for return movement of empty plastic bags after inbound loaded movement.

Note 4: For the purpose of applying this rule, the term "bulk commodities" includes:

- A. Commodities moving in tank trailers furnished by carrier at carrier's expense.
- B. Any commodities shipped loose, or in mass, which must be shoveled, scooped, or forked in handling and which are neither in packages nor in units of such size as to readily permit handling piece by piece.

AAR Approved Load Plans

A list of Association of American Railroads approved load plans is included in appendix A. These methods have been tested and approved by the damage prevention committee of the Association of American Railroads. All intermodal loads shipped on KCS must adhere to a load plan approved by the AAR, or approved by the KCS Damage Prevention Group. For approval to ship a commodity that will not be loaded according to one of the approved load plans listed here, or to obtain assistance developing a load plan, contact the KCS Damage Prevention Group at KCSR_FreightClaims@kcsouthern.com.

Appendix A

Tested and Approved Securement Methods of Loading Freight for TOFC/COFC Service

Method	Name of Load Plan
A-1	<u>Palletized Steel Products</u> Secured Using a Controlled Floating Load (Maximum Weight 45,000 lbs)
A-2	79-55 Gallon <u>Closed Head Drums</u> Secured with Anchor Plated and Steel Straps (Maximum Weight 44,500lbs)
A-3	<u>Steel Drums</u> in a 4-3-4 Pattern Secured with Wall Anchor and Steel Straps
A-4	<u>Steel Drums</u> in a 4-4 Pattern Secured with Wall Anchors and Steel Straps
B-1	<u>Drums</u> Loaded in Two or Three Sections Secured with Ty-Gard™ Barriers
B-2	<u>Mixed Load</u> Secured with Ty-Gard™ Barriers
B-3	<u>Double Layer Load</u> Secured with Ty-Gard™ Barriers
B-4	<u>40" Diameter Roll Printing Paper</u> Secured with Ty-Gard™ Barriers
B-5	<u>Brick</u> Secured with Floor Blocking and Ty-Gard™ Barriers
B-6	<u>Bulk Boxes</u> Secured with Floor Blocking and Ty-Gard™ Barriers
B-7	Intermediate <u>Bulk Containers for Liquids</u> Secured with Ty-Gard™ Barriers
B-8	78-80 <u>Tight Head 55 Gallon Steel or Plastic Drums in Two Layers</u> Secured by Ty-Gard™ in a 20' ISO Container
C-1	<u>Palletized Bag Loads</u> Secured with Palla-Gard™ Devices (Maximum Weight 45,500 lbs.)
C-2	<u>55 Gallon (Closed Head) Drums and Polyethylene Drums</u> Secured with Drum-Tite™ Devices (Maximum Weight 47,200 lbs.)
C-3	<u>Box Loads on Pallets or Slipsheets</u> Secured with Palla-Gard™ Devices (Maximum Weight 45,000 lbs.)
D-1	<u>Mixed Loads</u> Secured with Wall Anchors and a Freightmate™ Barrier
E-1	<u>Coils on Skids</u> with Rubber Mats on Floor in Refrigerated Equipment
E-2	<u>Coils on Skids</u> with Rubber Mats on Floor (Hardwood Flooring)
E-3	<u>Wire Cable Coils</u> Using Guide Rails and Rubber Mats
E-4	<u>58" Diameter Roll Pulpboard</u> on End Using Rubber Mats
E-5	<u>50" Diameter Roll Wrapping Paper</u> on End Using Rubber Mats
E-6	Bilge Loaded <u>Large Diameter Roll Paper</u> on Wood Cradles
E-7	<u>Closed Head Steel Drums</u> in a 3-4-3 Pattern on Rubber Matting with Steel or Approved Polyester Cord Strapping
E-8	Through Loads of <u>58" Diameter Roll Pulpboard</u> on End Using 2 Three-Foot Wide Rubber Mats

E-10	<u>Roll Pulpboard</u> on End Using Rubber Mats with an Incomplete Second Layer
E-11	Cancelled
E-12	<u>45" Diameter Roll Paper</u> on End Secured Using 2' Wide Rubber Mats
E-13	<u>50" Diameter Newsprint</u> on End Using 1' Wide Rubber Mats
E-14	<u>40"-45" Diameter, Large Width Roll Paper</u> on End in Two Sections Using Two 2' Wide Rubber Mats Under Each Section and Steel Strapping
E-15	<u>Skidded or Palletized Flat Paper Stock</u> Secured Using Rubber Mats and D.I.D. Bags
E-16	<u>Palletized Roofing Shingles</u> Secured Using 1 Foot Wide Rubber Mats
E-17	<u>40" Diameter Roll Paper</u> on End Secured Using Two Foot Wide Rubber Mats
E-18	Split Loads of <u>58" Diameter Roll Pulpboard</u> on End Using 3' Wide Rubber Mats (<i>If loading split loads of 58" diameter roll pulpboard on end in trailers having large metal plates approximately 9' in length at the nose use method E-19</i>)
E-19	Split Loads of <u>58" Diameter Roll Pulpboard</u> on End Using 3' Wide Rubber Mats When stowed in Trailers Having Large metal Plates Approximately 9' in Length at the Nose
F-1	<u>Case Goods on Slip Sheets</u> Secured with Friction Panels and D.I.D. Bags in Trailers
F-2	<u>Case Goods</u> Secured with D.I.D. Bags
G-1	<u>40" Diameter Rolls of Printing Paper</u> Secured with Wood Blocking and Two Unitizing Straps
G-2	Double Layer <u>Drum Load</u> Secured with "T" gates in a 20' Container
G-3	Double Layer <u>55 Gallon (Closed Head) Steel Drums</u> in 20' Containers with Bracing Slots 1" or Greater in Depth or with Protruding Rear Corner Posts
G-4	<u>55 Gallon Open Head (Steel) Drums or Closed Head (Steel or Polyethylene) Drums</u> in Trailers/Containers with Bracing Slots 1" or Greater in Depth or with Protruding Rear Corner Posts
G-5	<u>58" Diameter Rolls of Pulpboard</u> on End Using Floor Blocking
G-6	<u>Dimensional Lumber</u> Secured by Floor Blocking and D.I.D. Bags
G-7	<u>58" Diameter Roll Pulpboard</u> on End Using Pre-assembled Wood Blocking
G-8	<u>Unitized Products</u> Secured by Wood Bulkheads
G-9	<u>Commercial Refrigeration Units</u> Secured by Floor Blocking and D.I.D. Bags
G-10	<u>Bilge Loaded 40" Diameter Paper Rolls</u> Using Steel or Approved Polyester Cord Strapping and Wood Blocking
H-1	Various Commodities Secured with <u>Door SavR™</u>
H-2	Various Commodities Secured with Permanent <u>Floor Anchors and Strapping</u>
H-3	<u>55 Gallon Drums Secured</u> by a Wood Gate and Special Blocking devices for Belt Rails in Refrigerated Trailers
H-4	Mixed Load Secured by a <u>Wood Gate and Special blocking Devices for Belt Rails</u> in Refrigerated Trailers
H-5	Plywood Secured by Steel Strapping to Permanent Floor Tracks
H-6	Palletized Commodities Secured by Nylon Web Strap Assemblies and Floor Blocking



H-7	Two Layer <u>Steel or Polyethylene Closed Head Drums in 20' Containers</u> Secured by We Straps Attached to 'D' Rings
H-8	<u>Bags on Pallets or Slipsheets</u> Secured by Trailer Doors (Maximum Load Weight 46,000 lbs)
H-9	Multi-wall Corrugated Longitudinal Void Fillers and Trailer Doors Used to Secure <u>Products in Cans or Bottles</u> Unitized on Pallets or Slip Sheets
H-10	<u>Beverage Products Unitized on Pallets or Slipsheets</u> and Secured Using Longitudinal Void Fillers and Trailer Doors



Other Publications Governing Rail Intermodal Shipments:

Intermodal Loading Guide, Association of American Railroads, ©2001.

Intermodal Interchange Rules Including Billing and Repair Procedures, Association of American Railroads, Effective January 1, 2007

Title 49, United States Code

Rules Governing the Loading, Blocking and Bracing of Freight in Closed Trailers and Containers for TOFC/COFC Service, Railinc, © 2001.

AAR Open Top Loading Rules Manual, Association of American Railroads, ©2003.