

# Alaska Railroad Corporation Load Manual



**The ARRC reserves the right to make changes to this manual at any time. Please make sure to look up the most current version at [www.alaskarailroad.com](http://www.alaskarailroad.com) under Freight Services.**

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Updates will be in red.

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## ***ARRC General Tie Down Rules***

- Safety to the public, customer, shipment and ARRC is the most important subject to be considered in the application of these rules. When in doubt as to their interpretation, users must apply to an ARRC Car Department Supervisor to ensure the safest course is followed.
- ARRC Carmen may request additional securement at any time.
- All dunnage must be wider than it is high and free from defects.
- All decks will be free from ice and snow before loading.
- All loose or unsecured items such as container locks, straps or unused dunnage will be removed or stowed prior to loading, securing and/or departure.
- Placement of loads will not interfere with applicable safety appliance regulations.
- All loads will be placed to the center of the car.
- All containers and platforms secured with twist locks must be down flat on all four corners with locks fully engaged.
- Containers not secured with twist locks must be protected by the use of stub / pocket stakes and strapped securely to rail car.
- Stub stakes will be located not more than four (4) feet nor less than three (3) feet from each end of container or platform and must be fully seated in stake pocket.
- Twenty foot containers require at least two straps if not secured with twist locks.
- Forty foot containers require at least 2 straps or more straps dependent upon the weight of the load if not secured with twist locks.

- Polyester webbing used for securement of cargo on cars, trailers and platforms must have a minimum design (safety) factor of 3:1 between the working load limit and the maximum breaking strength.
- All loads, stationary or mobile must be secured to a minimum of 150% of the load's own weight. Chains should be crossed when possible and angled 45 degrees from the deck, pulling in both directions on load.
- All multiple pieces of blocking or dunnage stacked in layers must be firmly nailed to each other. Bearing pieces on wooden decks must be nailed to the deck. Bearing pieces on steel decks must be secured back to the load if possible, or cross braced to prevent displacement.
- Dunnage should be of sufficient size and number to easily support the load.
- Separators should be at least 8 inches inboard on each end of the load and spaced equally along its length. Spacing should be not greater than 8 feet apart. Multiple layers of separators should be arranged in a vertical manner.
- All products must be secured.
- Bundles should be banded together before being stacked.
- Loads of multiple bundles must be unitized.
- Chains and binders must be arranged with the hook back to the chain and the binders wired to prevent loosening. Turnbuckle style binders must also be wired.
- Loads should be arranged with the larger pieces on the bottom and the smaller ones on top.
- Bands and straps must be free of defects and have softeners/edge protectors applied where passing over sharp objects or when clamping force will cause damage to the product.

- Loads equipped with pneumatic tires must have wheel chocks secured against leading and trailing edges of tires. Wheel chocks are to be applied in front of front tires and in front of fore and behind aft rear axle(s). Wheel chocks must be applied tight against the tire(s).
- Loads of pipe or similar products must have pipe chocks nailed to the ends of all separators and separators should be arranged in a vertical manner.

## ***Glossary***

Bands, application:

Securement: Bands that anchor or tie down a load to the car; on a floating load, it can be an encircling band or interlacing band.

Package: Bands that hold one or more pieces together to form a package.

Interlacing/Unitizing: Bands that hold two or more packages together.

Encircling: Bands that wrap around the load.

Bearing Piece: Material placed on a car, trailer floor or platform, underneath lading, to facilitate loading or unloading; to maintain 4 inches of clearance below overhanging portion of load and any part of idler car or cars; and to distribute weight of lading over floor of car or trailer.

Binder: a device that consists of a link and hook on each end with a concentric lever to apply tension to a chain assembly.

Blocks: Wood material, nailed, bolted, or wired in position to secure lading in place.

Braces: Material used to retain lading or blocking in position.

Clamping Piece: Wood member placed across top of load to keep lading in position, secured to car, trailer, or stake pockets with rods. Also used on machinery or vehicles to secure moveable parts.

Cleats: Wooden pieces secured to floor to reinforce blocking. Pieces secured to floor or blocking against lading to retain lading in position.

Cribbing: Metal or wood pieces placed under or against lading as a supplement to the primary load support to stabilize or hold lading in position.

**Edge Protector:** A device placed on the exposed edge of lading to distribute the forces over an area larger than the contact area of the tie down itself to prevent damage to the tie down or lading and to allow the tie down to freely slide when being tensioned.

**End Blocking:** Blocking used to prevent end movement of lading.

**Floating Load:** A load in which the lading is prepared into a unit with space between unit and ends of car/trailer and end blocking is omitted. The kind of load permits the dissipating of impact shocks by the lengthwise movement of lading over the floor of the car or trailer.

**Hardcore Paper:** treated cardboard that resists decomposition due to moisture. Usually a softner.

**Pallet:** A platform or skit on which lading is placed and secured; used to facilitate handling of small sized commodity shipments by mechanical means.

**Polyester Webbing:** Typically used in systems where low elongation and low creep are desirable. Polyester's higher density allows thinner webbings than nylon at equal strengths. Polyester has better resistance to moisture than nylon, although some coatings allow approximately equal performance of both types.

**Seperators:** Material places crosswise between layers of load extending through the full width of load to facilitate loading and unloading; to provide level support for additional layers; and to provide application of load securement items.

**Spacers:** Material placed crosswise between layers of a pile, extending for the width of pile only, to facilitate loading and unloading and to provide space for the application of load securement items.

**Stake:** A piece of timber or metal inserted in the stake pocket on sides or ends of flat cars or open top trailers to hold load in place and that extends slightly higher than top of load. Also used on inside of gondola cars to secure lading in position.

**Stub Stake:** A piece of timber or metal inserted in the stake pocket on sides or ends of flat cars or open top trailers to hold load in place and that extends sufficiently above floor to provide protection against side or end movement of lading.

**Sticker:** Material placed crosswise within a bundle that extends only the width of the bundles. Stickers provide rigidity and prevent slippage of individual pieces within bundles.

**Strapping, non-metallic:** Synthetic materials of various widths and thickness, each with standard load strengths, used to secure lading.

**Wheel Chock:** Concave or mitered blocking pieces used to secure wheeled units in position.

**Working Load Limit (Synthetic Webbing):** The recommended capacity of a web strap, specified as a fraction or ratio of the breaking strength.

## *Securement Items*

### *Blocking*



- Blocks should preferably be made of hardwood such as Ash, Birch, Cypress, Elm, Maple or Oak.
- Blocks must be free of defects such as large knots and splits.
- Blocking must always be wider than it is high
- Blocking less than 5 inches tall must be solid
- Blocking greater than 5 inches tall may be constructed by securely nailing multiple pieces together
- Blocks must be secured to deck with at least 4 nails widely spaced to resist twisting. Nails must be large enough to penetrate 1 ½ inches into the deck. Additional nails must be applied less than ten inches apart for the full length of the piece.
- Nails must be at least 1 1/2 inches longer than the thickness of the piece being added.

## *Double Cut Wedge Blocks*



- Double cut wedge blocks are typically used as wheel chocks on vehicles and also for locating and securing large diameter pipe.
- Blocks should preferably be made of hardwood such as Ash, Birch, Cypress, Elm, Maple or Oak.
- Blocks should be free of defects such as large knots and splits.
- Blocks must be secured to deck with at least 4 nails widely spaced to resist twisting. Nails must be large enough to penetrate 1 ½ inches into the deck.

## *Single Cut Wedges or Kickers*



- Blocks should preferably be made of hardwood such as Ash, Birch, Cypress, Elm, Maple or Oak.
- Blocks should be free of defects such as large knots and splits.
- Blocks must be secured to deck with at least 4 nails widely spaced to resist twisting. Nails must be large enough to penetrate 1 ½ inches into the deck.
- Wedges used for end blocking must have the long side against the deck.

## *High Tension Steel Bands*



- All banding used in securement of open top loads must be AAR approved.
- The use of second hand or reclaimed bands is prohibited.
- A high tension band that has been previously used, cut, or broken is considered second hand.
- Splicing of new banding is prohibited.
- High tension bands encircling pile must be machine tensioned and sealed toward the top of the load, in a location visible from the ground, when possible.
- High tension bands attached to side pockets or loops must be sealed no closer than 18 inches from loops or pockets.
- Free ends of bands must extend at least 2 inches from the seal, but not more than 12 inches.
- Tie down loops must be at least 3/8 inch in diameter and free of sharp edges.
- Metal band protectors are to be used at stake pockets and where bands contact sharp edges on equipment or lading.
- Metal protectors are required on sheet or plate steel. Composition material, treated hardboard, or hardcore paper protectors are acceptable in other areas.
- Protectors must be applied so as to prevent movement.
- Two seals per band is preferred in most cases, and required when shipping pipe.
- Each seal clip must be crimped twice.

## *Nonmetallic Strapping*



All approved nonmetallic strapping will be assigned an AAR identification number or mark and applied in a manner, which makes the markings readily visible to the load inspector.

### Approved applications for nonmetallic strapping

- 5/8in X .040in nonmetallic strapping may be used for package bands on hardboard siding, oriented strand board, packaged lumber, landscape timbers, packaged redwood, or engineered packaged I-Joists 48in. X 24in. or less.
- Nonmetallic strapping may be applied by the shipper to any load in addition to, but not in place of, previously recognized and/or required securement. Such additional strapping will not be included in overall securement computations.
- The mechanical department of the Alaska Railroad must approve other uses of nonmetallic strapping in advance.
- Experimental loads will be considered on a case-by-case basis.



Association of American Railroads

Current as of October 17, 2013

This table corresponds with AAR Open Top Loading Rules, Section 1, Table 19.2

**AAR Approved Type 1A Bonded/Woven Polyester Strapping**

Manufacturer/ Distributor	Approved through (Mo/Yr)	Grade 3 <sup>a/</sup>		Grade 4 <sup>b/</sup>		Grade 5 <sup>a/ b/</sup>		Approved Joint Type
		AAR ID (Part No.)		AAR ID (Part No.)		AAR ID (Part No.)		
		MBS (LBS) 1,585	MBS (LBS) 2,100	MBS (LBS) 3,285	MBS (LBS) 4,400	MBS (LBS) 4,200	MBS (LBS) 5,400	
Caristrap Weatherguard	04/15	CW-60 WGHD		CW-105 WOJ			CW-125 WOJ	Buckle
Caristrap Weatherguard	05/15			CW-105 WGSD				Buckle
Carolina Strapping <i>GatorSTRAP</i>	03/16	AAR-80 CS-2025		AAR-80 CS-2040			AAR-80 CS 2055	Buckle CSB 9093 (CS2055)
Carolina Strapping <i>MakoSTRAP</i>	06/15			AAR-80 CS-5080				Buckle
ITW/Signode Avistrap	05/14	AAR-11		AAR-11			AAR-11	Buckle
Pacific Strapping	06/13			AAR-79 (P104)				Buckle
Southern Strapping	07/15			AAR-78 (AW-105)				Buckle
Southern Strapping	07/15			AAR-78 (TY-105)			AAR-78 (AW-125)	Buckle
TAPEX American Corp.	07/14	AAR-1 (65WLMD)						Buckle (170) B6-OT
TAPEX American Corp.	07/14			AAR-1 (105WXH)				Ladder Buckle FCT-10 (FLB)
TAPEX American Corp.	07/14						AAR-1 (125WXH)	Ladder Buckle FCT-12 (FLB)
Cordstrap USA Inc.	02/16			AAR-77 (CC105)		AAR-77 Cordlash 95	AAR-77 Cordlash 105	Buckles CB10 (CC105) HDB10N (Cordlash 95 &105)
R.C. Packaging Systems Inc.	01/15	AAR-38		AAR-38			AAR-38	Buckle



R.C. Packaging Systems Inc.	12/15			AAR-38 (RC105)				Buckle
Redback Industries	03/16			AAR-39 (RBC105) (CW105RB)				Buckle
Complete Packaging Systems, Inc. <i>TEX-STEEL™</i>	05/16			AAR-83 CPS105			AAR-83 CPS125	G4-CB10F Wire Buckle G4-HDB35N G5-HDB12C

<sup>a)</sup> Strapping is acceptable for use as a substitution for steel package bands up to and including 3/4 in. x .028 in. only where substitution is specifically permitted in lumber figures in Section No. 5.

<sup>b)</sup> Strapping is acceptable for use as a substitution for steel bands up to and including 1 1/4 in. x .031 in. under applicable lumber figures where substitution is specifically permitted in Section No. 5, unless otherwise specified.



Association of American Railroads

Current as of August 27, 2014  
**This table corresponds with AAR Open Top Loading Rules, Section 1, Table 19.3**

Manufacturer/ Distributor	Approved through (Mo/Yr)	AAR Approved Type IA Polyester Strapping Grades 6 thru 8											
		Grade 6			Grade 7			Grade 8			Approved Joint Type Hook/Buckle	Approved Joint Type Buckle	
		AAR ID (Part No.)	MBS lb (N) 7,700 (34265)	AAR ID (Part No.)	MBS lb (N) 11,000 (48930)	AAR ID (Part No.)	MBS lb (N) 15,000 (66723)						
Cordstrap USA Inc.	6/17	AAR-77 Cordlash 150	X	AAR-77 Cordlash 200	X	AAR-77 Cordlash 750	X	CDBH12 or CDBH12-Extended	HDB12C, HDB12N, DLB12N, DLB12N150, Dynablock 12- 150, DLB12N200, Dynablock 12, DLB15, DLB15N, Dynablock 15 or HDB15N				
Carolina Strapping GatorLASH	3/16	AAR-80 CS 8040	X	AAR-80 CS 8050	X	AAR-80 CS 8070 (08/17 exp)	X	CSB9075	CSB9090 CSB9091 CSB9096				
Signode / Avistrap	10/13	AAR-11	X	N/A	N/A	FCH-13 (HKB)		FCT-15					
Southern Strapping	5/17	AAR-78	X	AAR-78	X			SSLB 40					
TAPEX American Corp.	7/17	AAR-1 (135WXH)	X	N/A	N/A	FCH-13 (HKB)		FCT-13 (FLB)					
Caristrap Int'l	1/15	Carilash AG40	X	Carilash AG50 (12/15 exp)	X	Carilash AG75 (09/17 exp)	X	-	BN1431(AG40 & AG50) LG75(AG75)				
Redback Industries	10/16	AAR-39 RL150	X	N/A	N/A	-	-	Ladder					



## *Synthetic Webbing*



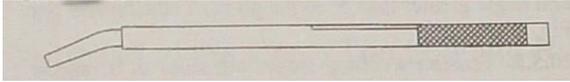
- Nylon webbing is not approved for securement in open top loading. Woven polyester webbing is the only approved webbing to be used.
- Woven polyester webbing must have a design safety factor of 3:1.
- Working load limit will be used to calculate number of straps required to ensure safety factor is maintained.
- Webbing must be applied without tears, holes, cuts, twists or kinks which degrade its working strength.
- Webbing must be applied within 5 degrees of perpendicular.
- Softeners must protect the webbing from any sharp points or edges.



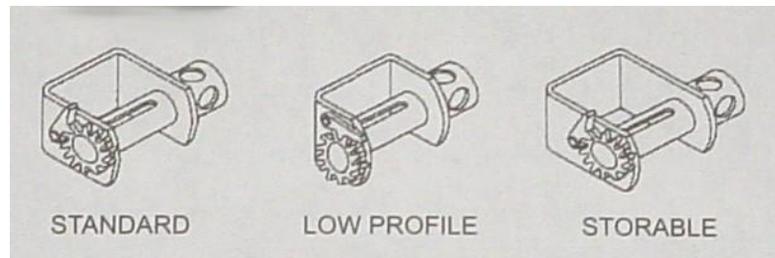
- Hooks on the straps must be arranged in a hanging fashion so that if the strap loosens, it will still remain connected to the rub rail of the trailer. If this can't be done the hooks will need to be wired to the trailer, platform or car.

## ***Winches and Similar Components***

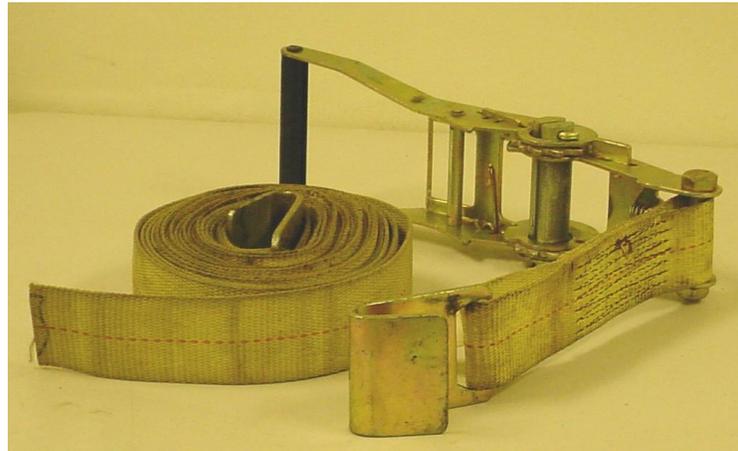
- Winches, ratchets, hook eyes, connecting chain etc. must equal or exceed minimum breaking strength of webbing being used.
- A winch bar such as the one illustrated below should be used. Cheater bars are prohibited.



- Winches should be in good working order with no sharp edges or defects that may harm the webbing.



- Portable web assemblies with ratchet buckle and end hooks are also acceptable on the ARRC.



# Chains



- Chains must be free of cracks, bent or twisted links, gouges or pits, knots, or portions subjected to high temperature.
- Chains must always be hooked back to the chain.
- Chain assemblies provided by a chain manufacturer with the hooks joined by a flash or butt-welded connecting link and carrying the manufacturer's permanent and distinctive mark identifying the grade of the link are acceptable.
- Chain dimensions, and working load limits are shown in the table below.
- Obert Marine 1/2 inch long link barge lashing chain has a working limit of 10,000 lbs and is acceptable to use as tie down chain on trailers, platforms and cars.

Table 21.4 Chain grade and working load limit (lb)

Nominal Size		Grade 30 <sup>1</sup>	Grade 43	Grade 70	Grade 80	Steel	Special
Inch	mm	Proof Coil	High Test	Binding	Alloy	Alloy	
5/16	8.0	1,900	3,900	4,700	—	—	—
3/8	10.0	2,650	5,400	6,600	7,100	—	9,000
1/2	13.0	4,500	9,200	11,300	12,000	—	13,750
5/8	16.0	6,900	11,500	15,800	18,100	16,500	—
3/4	20.0	10,600	16,200	24,700	28,300	23,000	—
7/8	22.0	12,800	—	—	34,200	—	—
Specifications		NACM-1900 Specs	NACM-1990 Specs	NACM-1990 Specs	NACM-1990 Dimensions & Properties		See Footnote 2

<sup>1</sup>Grade 30 replaces Grade 28, which may be used at values stated for Grade 30.

<sup>2</sup>Must have a design factor of no less than 4:1. Does not apply to equipment placed into service prior to September 1, 1996.

## 8.0 IDENTIFICATION

- 8.1 Grade 30, 43, and 70 Chain**  
Grade 43, 70, and 5/16" (8.4 mm) and larger Grade 30 chains shall have periodic embossing for identification purposes. The embossing shall include the manufacturer's identification mark or symbol and the grade indicator as shown in 8.1.2 through 8.1.4.
- 8.1.1 5/16" (8.7 mm) and 3/8" (10 mm) Grade 43 and 70 chain shall be embossed at intervals no greater than 1 ft. (0.3 m). All other Grade 30, 43, and 70 chains shall be embossed at intervals no greater than 3 ft. (0.9 m).
- 8.1.2 5/16" (8.4 mm) and larger Grade 30 chains shall be embossed at least with 3, 30, or 300.
- 8.1.3 Grade 43 chains shall be embossed at least with 4, 43, or 430.
- 8.1.4 Grade 70 chains shall be embossed at least with 7, 70, or 700.
- 8.1.5 1/4" (7 mm) and smaller Grade 30 chains may be embossed at the option of the manufacturer.
- 8.2 Grade 80 and 100 Chain**  
Grade 80 and 100 chains shall have periodic embossing for identification purposes. The embossing shall include the manufacturer's identification mark or symbol, the traceability code or date code, and the grade indicator as specified in 8.2.2 and 8.3.3.
- 8.2.1 Grade 80 and 100 chains shall be embossed at intervals no greater than 3 ft. (0.9 m).
- 8.2.2 Grade 80 chain shall be embossed at least with 8, 80, or 800.
- 8.2.3 Grade 100 chain shall be embossed at least with 10, 100, or 1000.
- 8.3 Machine, Coil, Passing Link, and Stainless Chain**  
Machine, Coil, and Passing Link, and Stainless chains may be embossed at the option of the manufacturer.
- 8.4 Embossment Requirement**  
All chain identification markings shall be embossed using raised characters. Chain links shall not be marked with indented characters.

## *Approved Shackle/Nut Application*



Proper Application of Jam Nut



Application of Steel Type Lock Nut



Application of Nylock Type Nut



Application of Wire



Shackle bolts must be wired as shown.

**In weather above 40 degrees duct tape and zip ties are also allowed.**

## *Load Binders*

- Binders must be marked with the rated capacity equal to their minimum breaking strength.
- The working load limit of the chain to be used should be equal to the capacity of the binder.
- Binder must be equipped with two grab hooks.
- Grab hooks should be compatible with the size of chain being used.
- Welding of binders to chain is prohibited.

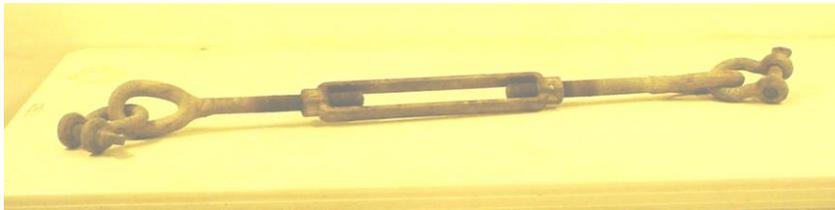


**Ratchet Type**



**Lever Type**

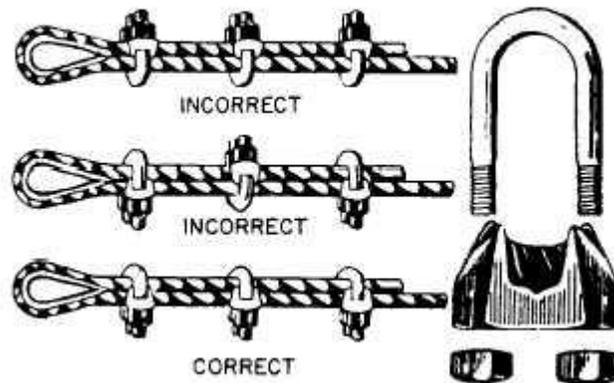
- Binders of the lever type must be wired to prevent loosening in transit.



**Turnbuckle Type**

- Turnbuckle binders must be secured to prevent loosening during transit by using jam nuts on the shafts or using wire when there is a hole in the shaft for that purpose.
- Softeners should be used where chains may damage load or where load may damage chain.

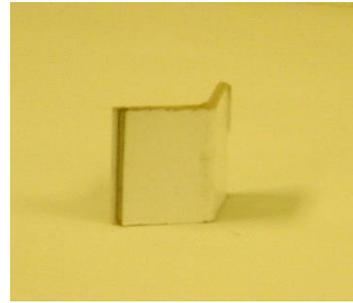
## Wire Rope/Cable



- Where wire rope/cable is used, the ends must be overlapped a minimum of 12 inches
- The minimum number of clips is as follows

3/8 inch cable	2 clips spaced 2 ¼ inches apart
½ inch cable	3 clips spaced 3 inches apart
5/8 inch cable	3 clips spaced 3 ¾ inches apart
¾ inch cable	4 clips spaced 4 ½ inches apart
7/8 inch cable	4 clips spaced 5 ¼ inches apart
1 inch cable	4 clips spaced 6 inches apart
- Cable clips must be applied with the saddle in contact with the running end of the rope.
- Wire rope/cable must be protected at all sharp corners and edges.
- Wire rope/cables should be positioned so as not to touch each other.
- Used rubber hose, carpet, and hardcore paper work well as softeners to protect cable at sharp edges.

## *Softeners or Edge Protectors*



- Softeners can be made of used rubber hose, cardboard, old defective straps or carpet. Cardboard softeners must be of the treated type to avoid decomposition due to moisture. These softeners are often referred to as hardcore paper.
- Softeners are to be placed between, high tension steel bands, nonmetallic bands, synthetic web straps, wire rope/cable, chains and binders and other types of securement, and sharp edges or points to protect the load and securement pieces from damage.
- Softeners must also be placed between wire rope/cables where they intersect to avoid chaffing.
- Softeners should be secured in such a fashion as to avoid displacement should the load shift during transit.

## *Stub Stakes*

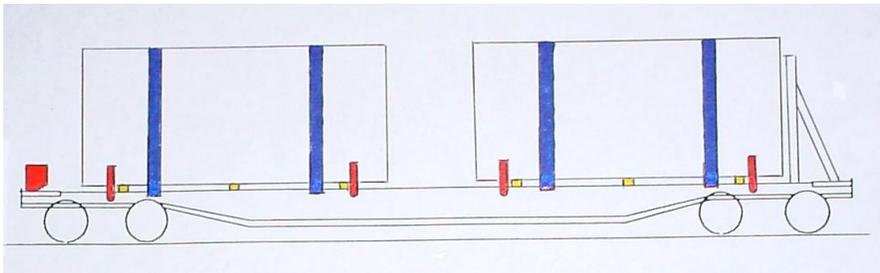


- Loads not secured in twist locks must be protected from lateral movement by the use of pocket or stub stakes.
- Pocket or stub stakes are to be made of metal and must be fully seated in the stake pocket.
- Pocket or stub stakes are to be employed when loading both platforms and containers on flat cars.
- Stakes are to be located not more than 4 feet nor less than 3 feet from the end of the container or platform.
- A sufficient number of pocket stakes must be applied to captured containers to prevent their movement off the side or end of the car should the load shift in any direction.

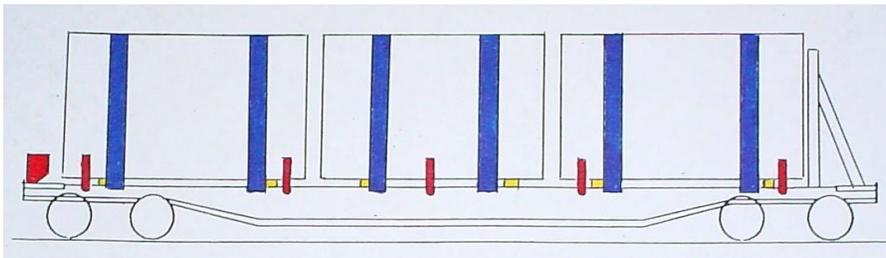
## *General Usage of Stakes*



Loads not secured with twist locks must be protected from lateral movement by applying stub stakes. Load must then be securely strapped to the rail car.



Loads should have four stakes each and non-bulkhead end of car must have two stakes applied.



“Captured” center loads require two stakes located at center of bundle.

## *Pallets*

The ARRC will allow palletized loads. Pallets must be in good condition and can only be single stacked on the trailer, platform or car. The loads must be securely wrapped in plastic wrap and be secured to the trailer, platform or car deck. Pallets used as separators are still prohibited.



When super sacks are loaded on trailers, pallets must be butted up together. At a minimum, the ends must have two straps placed over sacks and placed such to eliminate straps from slipping off. Inboard sacks will have at least one strap over sacks, may require more at times. **This goes for trailers, railcars decks or platforms. Double stacked palletized loads are prohibited.**



## *Chocks*



The ARRC will allow plastic chocks for Trailer On Flat Car (TOFC) loads. This change does not pertain to railcar loads, wood chocks are the only accepted chocks on railcar loads.

- Chocks must be completely on the bearing pieces and separators and tight against load.
- They must be nailed down with supplier's nails, or 3 each, 12d X 3 1/8 inch.
- Chocks must not be broken or cracked.
- Each end of the load must have chocks applied to each level of separators. In between the ends there must be a minimum of chocks on every other separator.
- There must not be missing chocks in locations other than what is specified in this document.
- On railcar loads wooden chocks should be made of hardwood and be free from all defects. Wooden chocks are to be 6x4x4 and placed square end tight against pipe load.
- Chocks must be positioned firmly against both sides of the load of pipe, top and bottom on all separators.
- Wood chocks must be nailed to separators using 20D nails with a minimum of four each. Quantity of nails will be dictated by loading figure used in the AAR Open Top Loading Rules. If power driven nails are used the quantity must be doubled, again quantity is based on figure used in AAR Open Top Loading Rules. When applying nails to

hard wood, holes must be pre-drilled to prevent the wood from splitting.

## *Button Cap Nails*



Button cap nails are commonly used in the construction trade to secure Styrofoam insulation to roof sheathing prior to putting down the tar paper and hot moping. They are also used to hold vapor barrier to wall panels before the siding is applied. These nails come with metal as well as plastic caps with the metal type being made for heavier duty applications.

- Button cap nails are strongly recommended for use as additional securement on tarps/covers where wind exposure could cause a failure.

## ***Weld Applied Securements to Railcars***

Welding lading directly to railcars is prohibited. The welding of rods, angle iron, flat bars and straps directly to both the load and railcar for the securement of the load is prohibited unless prior approval is given by proper AKRR personnel.



## *Intermodal Containers and Platforms*



The three most common types of conveyances used in intermodal freight on the Alaska Railroad are

1. Platforms
2. Post Platforms
3. Containers

All containers and platforms must conform to current industry standards.

This includes:

- Acceptable container lengths are 20, 24, 28, 40, 45, 48, and 53 feet.
- Acceptable platform lengths are 20, 24, 28, 40, and 53 feet.
- All containers and platforms must be in reasonably good condition.
- Door closure and locking devices must be fully operational with seals applied when loaded.
- Corner castings and locking pockets must be free of debris and corrosion.
- Containers and platforms must be clearly marked with appropriate identification.
- Platforms with collapsible posts must have posts securely locked in place.

## *Twist Locks*



Semi-Automatic Type



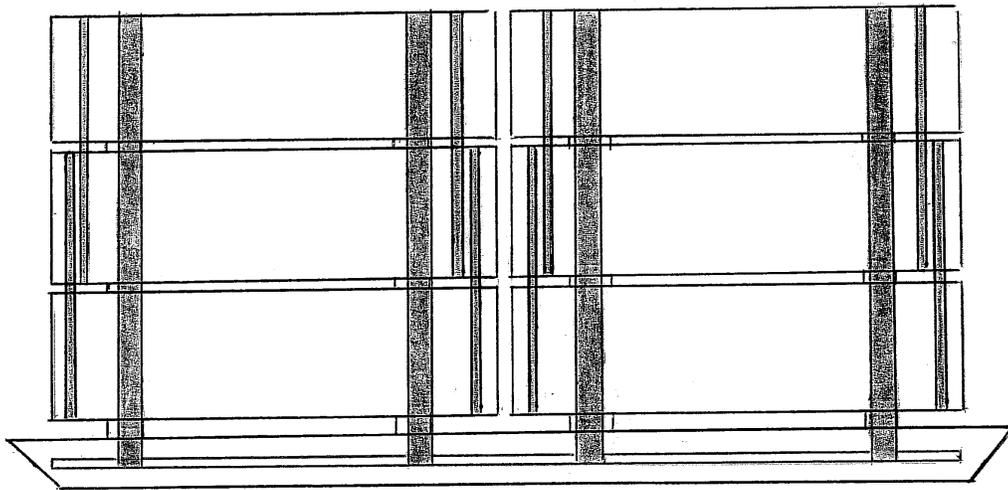
Manual Locking Type

- Twist locks are the preferred method of securing platforms or containers to the rail car.
- Twist locks must be free from defects such as cracks, chips, or excessive corrosion.
- Twist locks must operate in the intended method as described by the manufacturer.
- Operating handles, cables, and fixtures should move freely and detents must function as designed.

## *Securement Methods for Individual Commodities on Platforms*

### *Unitized Banding*

- Multiple layer loads require unitized banding
- Individual pieces of a load or separate bundles of material must be stacked with separators arranged in a vertical pattern.
- A minimum of two unitizing bands must be applied to each bundle
- Banding must be arranged to secure the bottom layer of the load to the second layer, the second layer to the third and so on until entire load is one “unit”.



- Unitized bundles must then have a minimum of two securement bands applied to each unit deck to deck.

## *Dimensional Lumber*



- Dimensional lumber must be banded in a unitized fashion with the bottom layer gut wrapped to the second layer of bundles which is gut wrapped to the third layer and so on.
- Two bands per bundle are mandatory.
- Four bands must connect the unitized load to the platform deck to deck.

## *Sheet Rock*



- Product must be fully supported without overhang
- Product must be covered
- Covers must be firmly secured in a manner that will enable them to resist dislodgement under extreme wind conditions.
- Side corner protectors are preferred, and when applied, must have 2 bands each. All bands must be crimped twice
- Each stack must have at least 2 bands to the platform with appropriate softeners to prevent damage to product.
- Bundles set back from the ends of the platforms must be gut wrapped longitudinally at least twice with all appropriate softeners applied.
- **Sheetrock used as bearing pieces is allowed, however it must be wider than it is high and in good condition.**

## *Styrofoam Loads*



- Product must be fully supported with no overhang.
- Load must be shrink-wrapped.
- Product must have at least two bands per stack, with appropriate softeners, connected to platform.
- Top side softeners should link adjoining stacks.
- Load must be end-banded at least twice with appropriate softeners.
- All bands must be crimped twice.

## *Tarps/Protective Coverings*

- Tarps or protective coverings are not required by the railroad but are often applied at shipper's request. Securement of these coverings must meet industry standards.



- Corner and end protectors are highly recommended as they not only protect the product but greatly aid in the securement of the tarp.

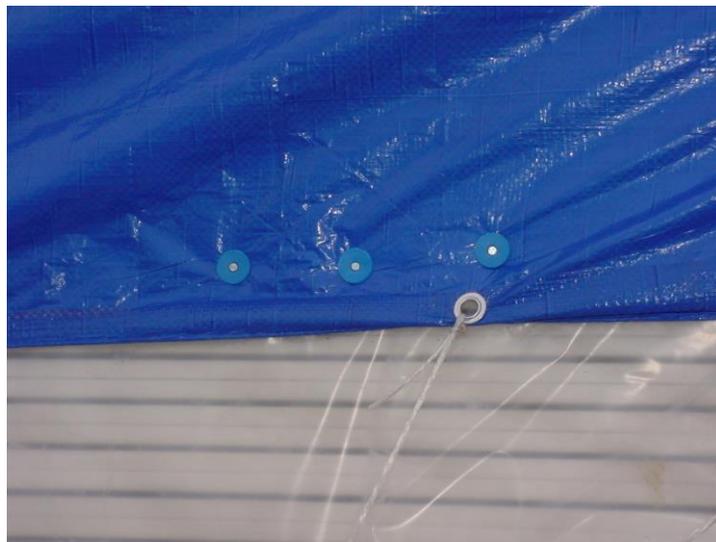


- Loose tarps do cause problems for the railroad.



In transit, when a tarp comes loose and extends beyond the top and or side of a car, it can be picked up by the high/wide load detectors located at various points along the rail belt. These detectors are positioned near the tracks to identify loads that have shifted out of position and when activated, the train is required to stop and the crew must inspect their train to discover the problem. In Alaska, this can become a two or three mile walk in sub-zero

darkness to look at a flapping tarp. This not only causes train delays, but also exposes the trainman to unnecessary dangers.



- Button cap nails are strongly recommended for use as additional securement on tarps/covers where wind exposure could cause a failure.

## *Structural Steel*

Structural steel is inherently a problematic type of load.



Different shapes and sizes, along with the desire to keep a multiple piece “building kit” together on a single trailer or platform can create many challenges.

- Multiple pieces of blocking or separators stacked in layers must be firmly nailed to each other.
- Bearing pieces on wooden decks must be nailed to the deck. Bearing pieces on steel decks must be secured back to the load if possible, or cross braced to prevent movement.
- Blocking should be of sufficient size and number to easily support the load.
- Separators should be located at least 8 inches inboard each end of the load and spaced equally along its length.
- Separators should not be spaced greater than 8 feet apart.
- Separators should span the entire width of the load when possible.
- Multiple layers of separators should be arranged in a vertical manner.
- Braces should be affixed to each end of separators against load to prevent migration laterally.
- All products must be secured.
- Bundles should be unitized before being stacked.
- Multiple layer loads must be secured in a unitized manner.
- Chains and binders must be arranged with the hook back to the chain with the binders secured to prevent loosening.
- Softeners must be applied where sharp edges might cause damage to bands or straps.



- **Cribbing applied to support through a void can be higher than it is wide, but it must be braced or tied back to the load to keep it from rolling or migrating.**



- **All products must be secured. Loose objects on top of I-Beam or tucked inside of square tubing is unacceptable.**

## *Heavy Equipment*

- Chains must be applied as close to 45 degrees from the platform as possible.
- Chains must be hooked back to the chain and binders must be wired.
- Loads must be secured to a minimum of 150% of the load's own weight.
- Chains should be crossed when possible and angled 45 degrees from the deck, pulling in both directions on load.
- Blocking must be nailed to the deck or otherwise secured to prevent migration.
- Buckets and booms must be cross chained to prevent swinging. The bucket should be lowered to the deck when possible. Boom needs to be trailing.



- Articulation point lock must be engaged.



- Outriggers must be secured with locking pins or chained to prevent movement.

### *Dozer on Platform*



- Chains and binders must be applied to solid points on the chassis of the machine.
- Loads must be secured to a minimum of 150% of the load's own weight.
- Chains should be crossed when possible and angled 45 degrees from the deck, pulling in both directions on load.
- Loads should be cross chained when possible. If this can't be achieved, blocking must be applied along the inside of the track assemblies, then interconnected, and secured to the deck of the platform to prevent load from shifting laterally.
- Vertical hydraulic rams on the front of the machine need to be secured to prevent them from swinging out sideways.
- Binders must be wired.

## *Corrugated Steel Pipe*



- Pipe should have separators equally spaced along the length of the pipe.
- Separators should be located at least 8 and not more than 18 inches from ends of pipe.
- Separators should be arranged in a vertical manner and less than 8 feet apart. Separators that are rolled on ends where pipe chock sits need to be replaced (not used) so that the chock will sit flush on separator.
- Chocks must be positioned firmly against both sides of the load of pipe, top and bottom on all separators.
- Intermediate separators must have braces applied to prevent them from migrating out of position.
- Load must be package wrapped and unit banded.
- Sufficient securement should be added across the ends of the large pipes to keep the smaller pipes inside from shifting longitudinally.
- All banding should be tight and will require repair if one is found to be loose. No banding trapped between separators or bearing pieces. Approved repair would be the application of 2 inch nylon straps being applied to loose deck to deck banding as close to same location as possible to loose deck to deck band. Loose unitizing bands can be repaired by the application of 2 inch polyester straps but they must be placed as a unitizing securement as close as possible to the loose unitizing band.

## *Steel Pipe*



- Bundles of pipe should be arranged with both ends as even as possible.
- Pipe should have separators equally spaced along the length of the pipe.
- Separators should be located at least every eight feet and not more than 18 inches from the ends of pipe. Separators that are rolled on ends where pipe chock sits need to be replaced (not used) so that wood chock will sit flush on separator.
- Separators and end wraps must be positioned to include all pipe in the load.
- Separators should be arranged in a vertical manner and less than 8 feet apart.
- Chocks must be positioned firmly against both sides of the load of pipe, top and bottom on all separators. All banding must be tight and will require repair if one is found to be loose. No banding trapped between separators or bearing pieces. Approved repair would be the application of 2 inch polyester straps being applied to loose deck to deck banding as close to same location as possible to loose deck to deck band. Loose unitizing bands can be repaired by the application of 2 inch polyester straps but they must be placed as a unitizing securement as close as possible to the loose unitizing band.
- Intermediate separators must have chocks applied to prevent them from migrating out of position.
- Load must be package wrapped and unit banded. Wood chocks must be applied to railcar loads.

## *Plastic Pipe*



- Bundle wraps should be arranged in a vertical manner.
- Load must be unit banded.
- At least four bands must connect product with platform.
- Number of bands must equal or exceed the total weight of the load.
- The above picture is an excellent example of unitized banding.

## *Large Corrugated Plastic Pipe*



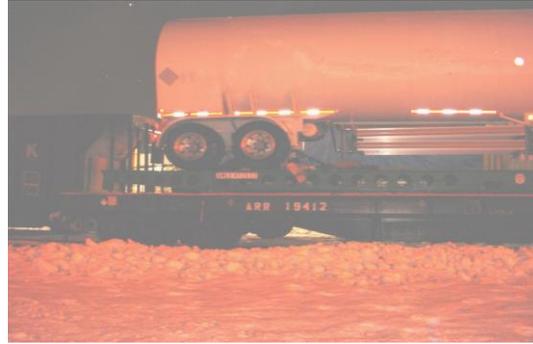
- Pipe should have separators equally spaced along the length of the pipe.
- Separators should be located at least every eight feet and not more than 18 inches from the ends of pipe. Separators that are rolled on ends where pipe chock sits need to be replaced (not used) so that wood chock will sit flush on separator.
- Separators should be arranged in a vertical manner and less than 8 feet apart.
- Chocks must be positioned firmly against both sides of the load of pipe, top and bottom on all end separators.
- Intermediate separators must have braces applied to prevent them from migrating out of position.
- Load must be package wrapped and unit banded. All banding must be tight and will require repair if one is found to be loose. No banding trapped between separators or bearing pieces. Approved repair would be the application of 2 inch polyester straps being applied to loose deck to deck banding as close to same location as possible to loose deck to deck band. Loose unitizing bands can be repaired by the application of 2 inch polyester straps but they must be placed as a unitizing securement as close as possible to the loose unitizing band.
- The load picture above has good separator placement and wedge blocks applied. Unit banding of the lower and upper bundles would greatly improve load's stability.

## ***Rubber Tire Vehicles***

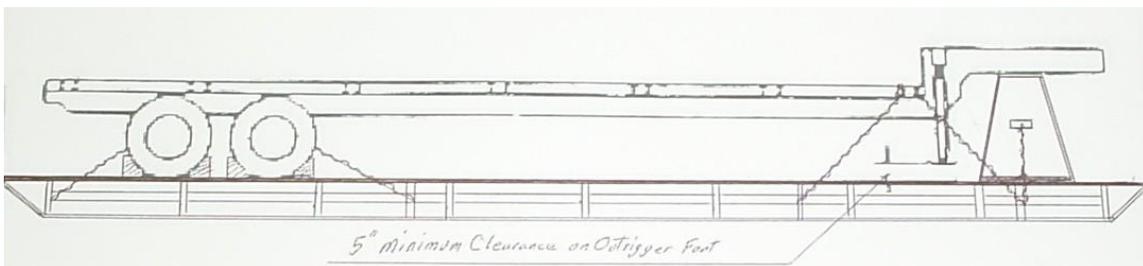
- Loads must be secured to a minimum of 150% of the load's own weight.
- Chains must be connected to un-sprung chassis members.
- Chains should be crossed when possible and angled 45 degrees from the deck, pulling in both directions on load.
- Binders must be wired.



## *Semi Trailer*

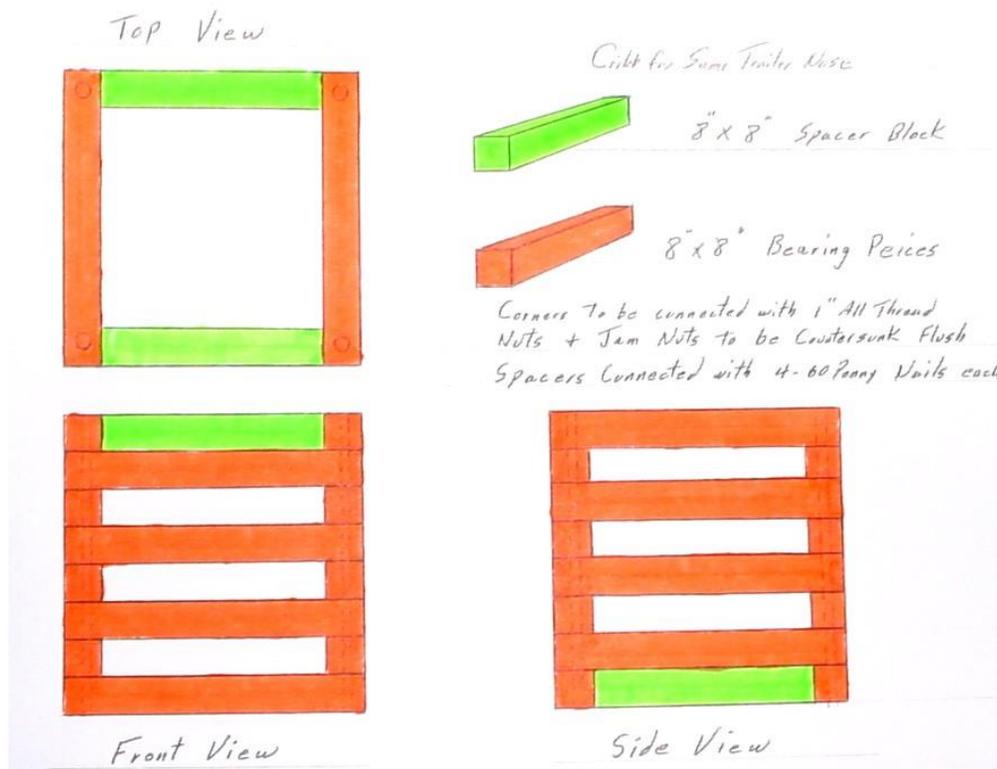


The above photos show a semi trailer on a platform. Close inspection reveals some basic problems. This trailer is secured to the platform while standing on its landing gear and the landing gear assembly was used as a point for securement. The required method for securement is illustrated below.



- Trailers must be secured to a minimum of 150% of the load's own weight. Blocking under the axles is no longer required. However this does not relieve the requirement of wheel chocks for wheels where they can be nailed to the deck or platform. If the load arrives having the axles already blocked then wheel chocking is not necessary.
- The front of the trailer should be supported with a cone or crib assembly.
- A single cross chain through the cone or crib for securement will be satisfactory.
- The nose of the trailer should then be tied down using four chains to ensure a solid connection to the platform and the cone/crib.
- A minimum gap of five inches is required between the landing gear and the deck.

## ***Cribbing for Semi Trailer on Platform***



- Crib must not be higher than it is wide.
- Bearing pieces to be constructed using 8X8 hardwood.
- Spacers to be constructed using 8X8 hardwood.
- Bearing pieces to be secured using 1inch all thread connecting the corners.
- Flat washers with nuts and jam nuts must be counter sunk in all four corners, top and bottom.
- Spacers must be toe nailed to bearing pieces using 60 penny nails. Four per spacer.

## *Empty Trailer Flats*



- Empty trailer flats must not be stacked more than three high.
- Four crossed chains and binders must be used per level.
- Binders and tag ends of chains must be wired.
- Two straps must be used per level.
- If trailers are stacked 3 high, landing gear must be fully retracted on top trailer only. (Reason - to limit potential clearance issues.)

## *Small Boats*



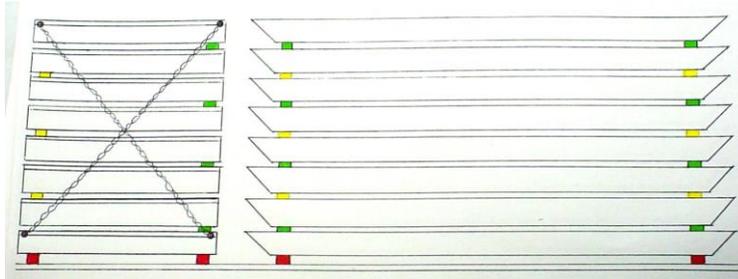
- Small boats should be securely cradled.
- Cradle construction must be tied together both laterally and longitudinally.
- Cradle must be securely constructed and nailed or bolted into one solid unit.
- Boat must be banded or strapped to cradle as well as to the platform
- Single cut wedge blocks should be placed at all four corners of the cradling device.
- The boats pictured are well supported and strapped. The addition of wedges nailed to the corners of the cradle, then to the platform, would improve this load substantially.

## *Miscellaneous Small Equipment*



- Small equipment must have at least two bands or straps securing each individual item.
- Softeners must be applied where bands contact sharp edges.
- Items must be supported on bearing pieces. No metal to metal contact.
- Overall securement strength must equal total weight of the load.

## *Empty Platforms on Flat Car*



Twist locks are red. Stacking cones are yellow and green

Requirements for shipping empty platforms in a stacked configuration:

- Empty platforms must be clear of ice and snow.
- Platforms must be tightly stacked to ensure full engagement of stacking cones.
- Two stacking cones are required on each level and must be arranged in an alternating manner.
- Crossed chains and binders or hard chains and turnbuckles must be applied to each end of the stack.
- Binders and/or turnbuckles must be wired.
- Stacks must be firmly locked to the car deck using twist locks or when stacks are not locked to the deck, the use of stub stakes is required.

## *Rail Loads on Flat Cars in a Revenue Train*



### Flat Cars without Bulkheads

- Bearing pieces must be 4x6 hard wood equal to the width of the car deck.
- Two bearing pieces must be located five feet from each end of the load, with five more evenly spaced between them. Seven pieces total.
- Separators must be a 1x3 located between all levels directly above the bearing pieces. Separators should extend two inches beyond the load on each side.
- Banding must be two inches, with the end two located approximately five feet from each end of the load; five additional bands must be evenly spaced between them, encircling the entire load. Softeners must protect the bands at the bottom edges of the load.



- Filler blocks must be 3 ½ X 5 ¼ X 24 inches long, center fillers in the top outside row at the point where the bands are located.



- Side stakes must extend 14 inches below the stake pocket and fully engage the uppermost rail on the side of the load.
- Side stakes must be firmly nailed in place to prevent movement.



### Flat Cars Equipped With Bulkheads

- Bearing pieces must be 4x6 hard wood equal to the width of the car deck.
- Two bearing pieces must be located five feet from each end of the load, with five more evenly spaced between them. Seven pieces total.
- Separators must be a 1x3 located between all levels directly above the bearing pieces. Separators should extend two inches beyond the load on each side.
- Five or more two inch web straps must secure the load deck to deck.
- Four steel side stakes must protect the load from lateral movement.

## *Railroad Ties on Flat Cars in a Revenue Train*



- Tie loads must have three 3 inch straps on the end stacks and at least two 2 inch straps on all the other stacks.



- Each bundle must have two 1 ¼ inch bands. Each stack must have at least two 2 inch, or three 1 ¼ inch unitizing bands.



- Bundles should be built five ties wide by four ties high. Bearing piece should be 4x6 lumber positioned so as to be wider than it is high. Hardwood should be used if possible. Multiple layers of stickers must be arranged in a vertical manner.

## *Canvas Sided Trailers*



The Alaska Railroad Corporation does not accept canvas sided trailers for rail transport.

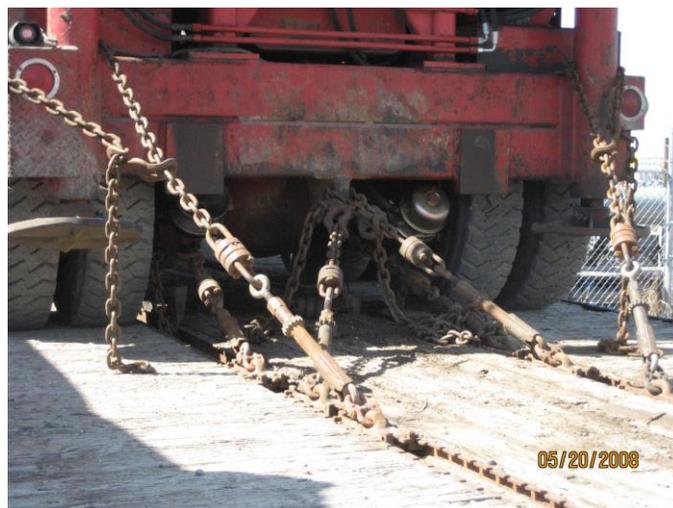
## *Chain Equipped Flat Cars*



- Chains that are not used must be securely stowed in chain rails to prevent dragging chain during transit.
- Be careful when wrapping chain around axles to keep from damaging air lines, shocks, brake lines, etc.
- Exercise care when loading / unloading tracked equipment to keep from damaging chain rails and chain sets.
- Make sure load is centered on car.
- Report damaged chain or chain rails.
- Chain capacity is 13,750 LBS.
- Remove nails and loose debris from deck and chain rails.
- Whenever possible, pull chain at 45 degree angle.
- Secure outriggers.
- Strap over trailer tongues and boom masts.
- Secure any loose stowed items with #9 wire.
- Ensure rail car brake staff is down prior to loading.
- Do not secure chains around hydraulic cylinders.
- Chain sets can be moved from rail to rail.



- Make sure boom equipped loads are placed with boom trailing in direction of travel.
- Mobile loads such as vehicles, crawlers, trailers etc. must be secured to a minimum of 150% of the load's own weight.
- Chains should be crossed when possible and angled 45 degrees from the deck, pulling in both directions on load.
- Contact ARRC with concerns of excessive height and width as well as final clearance.



## *Trailers with Drop Axles*



- Trailers with drop axles, that are to be placed on an 19100 series articulated flat cars must have the axle properly chained up to prevent the axle from dropping onto top of center sill of car, or onto rail car wheels.
- Trailers with drop axles do not have to be chained if they are placed on a 18700 series rail car.
- Chains must be hooked back to the chain, binders wired and tail of loose chain wired to keep from dragging.



## ***Blocking Axles***

The ARRC will no longer require blocking under the axles for roll-on equipment on railcars, vehicles on platforms or trailers. However this does not relieve the requirement of wheel chocks for wheels where they can be nailed to the deck or platform. If the load arrives having the axles already blocked then wheel chocking is not necessary.



### Light Trucks/Equipment Rated as 1 Ton or less:

Wheel chocks must be applied in front of the front tires and behind the rear tires. If the light truck has dual rear tires only one chock needs to be applied behind one of the dual tires on each side. Wheel chocks must be applied tight against the tire(s).



Trucks/Equipment Exceeding 1 Ton Rating:

Wheel chocks are to be applied in front of front tires and in front of fore and behind aft rear axle(s). Wheel chocks must be applied tight against the tire(s).



Trucks/Equipment Exceeding Plate Width of Railcar:

For any tires that overhang the plate width of the railcar by greater than 40% of total tire width additional blocking must be applied to the inside of each tire on any axle that this applies to, this blocking must also be nailed to the deck of the railcar. Wheel chocks must be applied tightly against the tires(s).



Block Specifications: Wheel chocks, minimum of 7x7x14 inch. If hardwood is used pre-drilled hole must be applied prior to the application of the nails to prevent splitting.

Nail specification: Blocking must be applied to car deck using 4 each 20-D nails in the heel spaced wide enough to prevent block from twisting and 2 each 20-D nails in each side of the block. Nails must be long enough to penetrate 1 ½ inches into the railcar deck.

## *Military Equipment*



For shipments inside Alaska only

## ***General Rules for Military Shipments***

- Safety to the public, customer, shipment and ARRC is the most important subject to be considered in the application of these rules. When in doubt as to their interpretation, users must apply to an ARRC Car Department Supervisor to ensure the safest course is followed.
- ARRC Carmen may request additional securement at any time.
- All decks will be free from ice and snow before loading.
- All loose or unsecured items such as container locks, straps or unused dunnage will be removed or stowed prior to loading, securing and/or departure.
- Placement of loads will not interfere with applicable safety appliance regulations.
- All loads will be placed to the center of the car laterally.
- All items and methods used for securement must meet requirements listed in the ARRC Load Manual.
- All loads must be secured to meet or exceed their own weight.
- All loads outside of Plate C will need clearances.
- Chains running through stake pockets must pull on the same side of the stake pocket as the load.
- Hooks must be re-hooked to chain above the deck surface.
- Make sure vehicles are spotted on car deck to create a 45 degree angle with tie down chains.

## *Key Points to Remember*



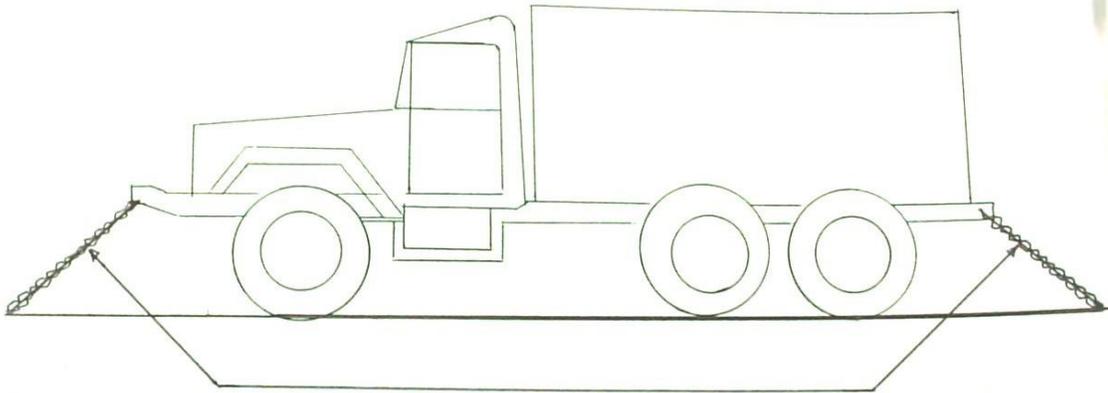
- Chains must be hooked back to the chain.



- Binders must be wired, #9 wire or bailing wire are best. At 40 degrees or above zip ties and duct tape are allowable.



- Tag ends of straps and chains must be firmly secured. Wire works best.
- All chains must be at least 3/8 inch with a working rating not less than 6,000 pounds.



- Total chains must be equal to or greater than the vehicle's weight. Chains should be positioned at a 45 degree angle to the deck and pull in opposite directions. Equal number of chains must pull in each direction.



- Crossed chains that pull equally in opposite directions toward the center of the vehicle are acceptable.
- Vehicles should not hang over the end of the trailer flat or the end of a rail car.



- Vehicles must be cross chained front and rear.
- Tie-down shackles should be employed when possible.
- Axle connections are acceptable.



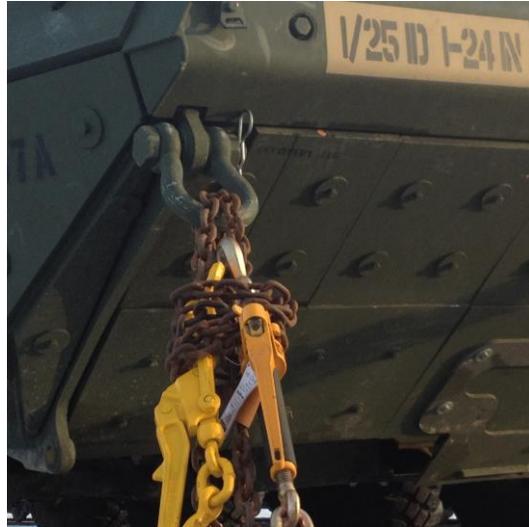
- Vehicles with trailers must have separate securement for the vehicle and the trailer.
- One chain or strap must be used to secure the tongue of the trailer to prevent disconnection from the towing vehicle.



- A minimum of 6 inches should be kept between separate vehicles at all times.



**Right**



**Wrong**

**You must use approved tie down points for any vehicle.**

- The recovery lug/shackle on a Stryker is not an approved tie down point.
- The axles are not an approved tie down point on any vehicle.

## *Military Load Examples*



This is a good example of securement for a Hummer and trailer. The chains are attached to the shackles front and rear. Axle attachment is not acceptable.



Another good example of securement for a medium truck and trailer.



This medium truck and trailer have overall good securement but it needs a strap on tongue of trailer. Strap does not need to be gut wrapped.



Good example of cross chaining to the center.



Good securement. Try to avoid any overhang if possible.



Good securement. Try to avoid any overhang if possible.

## *Mill Vans & Tri Cons*



Standard 20 foot military vans loaded on 40 foot trailer.



Two Tri-Con packages loaded on 40 foot trailer.

- Each 20 foot container and 20 foot Tri-Con package must have at least 2 straps applied deck to deck.



- Special care must be used to ensure that all inter-box connectors are fully engaged and in a locking position.
- Where separate vans or tri-con groups meet, the bottoms must be interconnected and secured back to the trailer.



- When on a platform/chassis trailer the outside ends of the two containers will be in twist locks. Where the two containers butt up together, there will be a clamp with a locking nut, no wiring will be necessary. Clamps must be tight.



- Hooks on the straps must be arranged in a hanging fashion so that if the strap loosens, it will still remain connected to the rub rail of the trailer. If this can't be done the hooks will need to be wired to the trailer, platform or car.



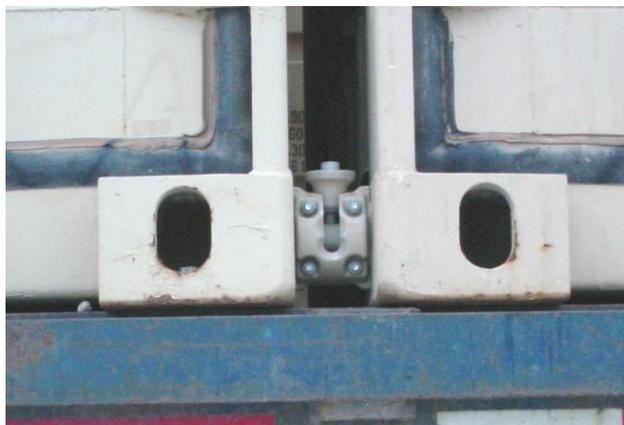
- Outside ends of both vans and tri-cons must be cross chained and bottom chained to the trailer.



- Hooks must always be hooked back to the chain.



- Where separate sections of a tri-con package meet, inter-box connectors must be applied to all four corners.



- Inter-box connectors must be in good shape and free from defects.

## ***Military Trailers on Platforms, Trailers or Railcars***

### **Light duty trailers**

- Trailers must have four cross chains and binders to the deck and a strap gut wrapped around the tongue going deck to deck.
- Trailers must be arranged with the tongue on the deck.
- Tongue jacks or landing gear are not to be in contact with the deck.

### **Medium duty trailers**

- Four cross chains and binders must be attached to the deck and a strap gut wrapped around the tongue going deck to deck.
- These trailers may have their landing gear in contact with the deck.
- Landing gear must be pinned and wired in place.

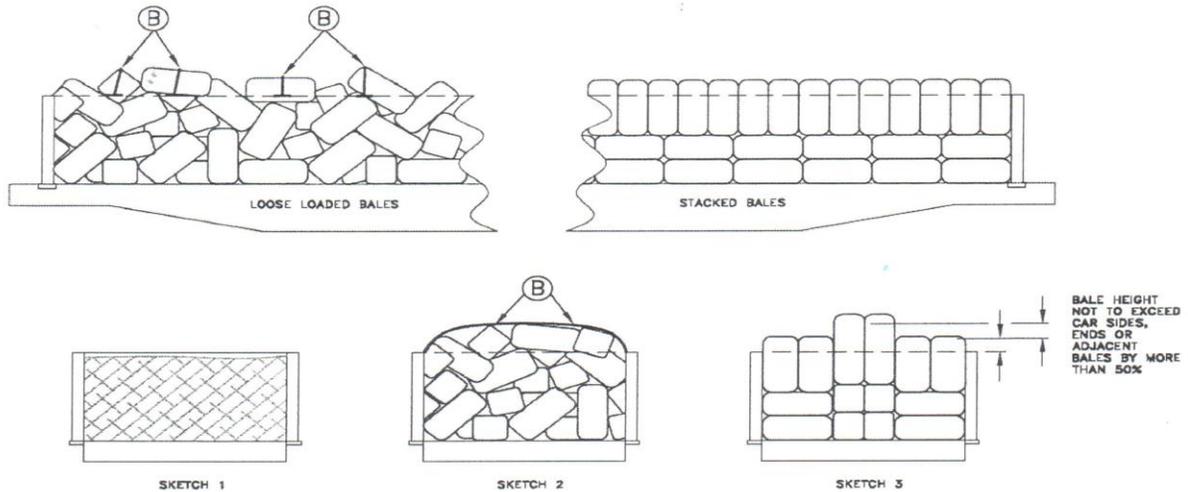


# Gondola Scrap Metal Loads Bound for Out of State

## AAR Open Top Loading Rules Manual

Fig. 87 (Rev. 06/13)  
(New 02/60)

### SCRAP, METAL, LOOSE AND BALED—GONDOLAS



Item	No. of Pcs.	Description
A		Brake wheel clearance: see General Rule 2 in Section 1.
B	2 per 8 ft or less of load length extending above car sides. Add 1 for each additional 4 ft of load length.	High tension bands: 2 in. x .044 in. Locate to contact and secure top baled scrap not in compliance with Note 1.
C	As required. (not shown in drawing)	Wire mesh or netting: of sufficient strength, width, and length to cover complete top of car. Secure to lading strap anchors. Do not secure to safety appliances, such as handholds and ladders. Not required when loaded to provisions of Notes 3 and 4.

**Notes and Additional Requirements:**

1. Baled scrap, extending above car sides and ends must engage car sides, ends and adjacent bales by minimum of 50% of bale. See Sketch 3.
2. Light scrap metal (e.g., loose tin or aluminum stampings, etc.) must be secured with wire mesh, netting and/or material of equal strength to prevent displacement by suction in transit. Heavy or baled scrap may be substituted and loaded on top of light material provided height limitation of Note 1 is not exceeded.
3. Loose scrap metal must be below top of car sides and ends of the car at any point of load. See Sketch 1.
4. Light scrap metal loaded 12 in. below top of car sides and ends requires no securement or covering.
5. Load weight must be evenly distributed end to end and side to side.

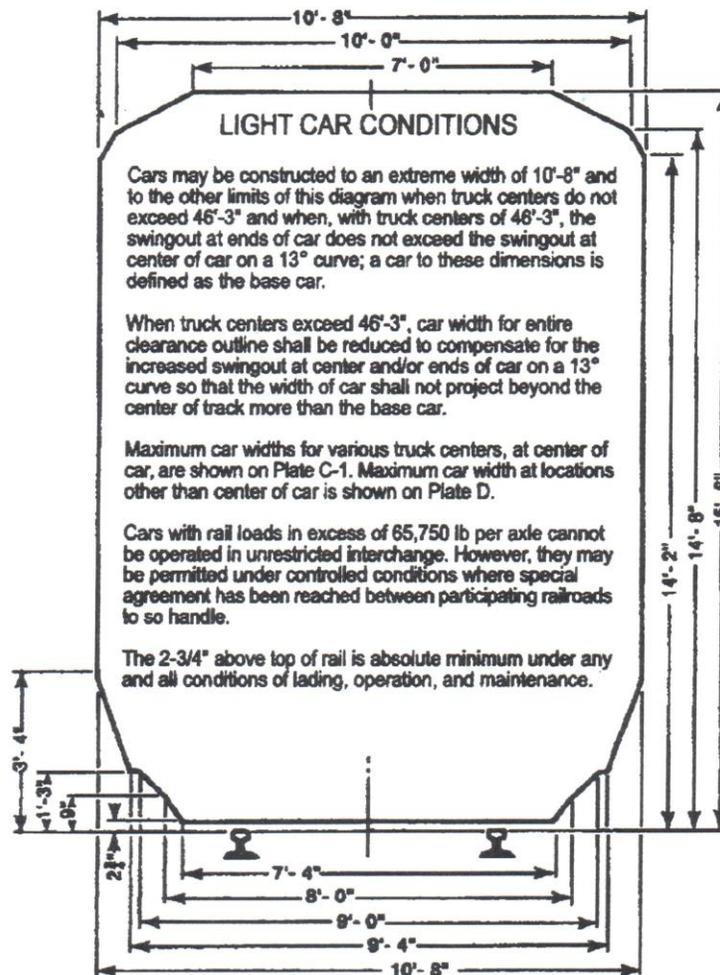
Reference the General Rules in Section No. 1 of the *Open Top Loading Rules Manual* for additional details.

# Plate C

If open top load dimensions are outside of this guide it will need clearances from the ARRC before movement.

<b>EQUIPMENT DIAGRAM FOR LIMITED INTERCHANGE SERVICE (WILL CLEAR OVER 95% OF TOTAL MILEAGE) STANDARD ADOPTED, 1963; REVISED: 1966, 1966, 1967, 1991</b>	
<b>ASSOCIATION OF AMERICAN RAILROADS SAFETY AND OPERATIONS</b>	
<b>DATE: AUGUST 1, 1991</b>	<b>PLATE C</b>

Unrestricted on all roads except on certain routes. For specific restricted areas on such roads see "Railway Line Clearances."



# ***How to Load a Railcar, Trailer or Platform for the Alaska Railroad***

## **3. WEIGHT DISTRIBUTION AND LOAD LOCATION ON SINGLE CARS AND INTERMODAL TRAILERS AND CONTAINERS**

- 3.1 Unless otherwise specified, the load distribution covered in this rule applies only to general service cars.
- 3.2 Unless otherwise allowed in specific figures, all load weights must be equally distributed end-to-end and side-to-side at origin. If ballast is needed to equalize weight distribution, refer to Rule 3.4.2.
- 3.3 For load distribution on 85-ft and 89-ft flatcars, including converted TOFC/COFC and multilevel flatcars, the shipper and originating carrier must confer with the car owner.

### **3.4 Load Distribution**

#### **3.4.1 Weight Limits**

##### **3.4.1.1 Truck Limits**

The weight of load on a car must not exceed the load limit stenciled on the car. The weight of load on one truck must not exceed one-half of the load limit stenciled on the car. In case of doubt, this must be verified by weighing the car.

##### **3.4.1.2 Lateral Limits**

The load must be located so that the weight along both sides of the car is equal for the entire length of the load.

##### **3.4.1.3 Floor Limits**

Commodities having a concentrated load bearing footprint cannot exceed the floor rating of the car. If floor rating is unknown, use 130 psi on a wood deck car; 430 psi on a 3/8-in. steel deck/nailable steel floor; and 740 psi on a 1-in. steel deck car, at any point on the car deck. The car deck must be in suitable condition. If in doubt, contact the serving railroad.

### 3.4.1.4 Center of Gravity Limits

3.4.1.4.1 The combined center of gravity (CCOG) of the car and load must be at 98 in. or less above top of rail. If CCOG exceeds 98 in. above top of rail, load may be classified as a dimensional shipment and requires railway clearance and special handling (see General Rule 4). Contact origin carrier for further direction. (CCOG formula is provided in Part 5.)

3.4.1.4.2 Large and heavy material such as ingots, slabs, billets, molds, castings, machines, etc., not covered by individual figures, must be loaded with the largest dimension on the bottom for greater stability.

### 3.4.1.5 End-of-Car Limits

3.4.1.5.1 Load weight, uniformly distributed from truck centers to ends of car, must not exceed 15% of the stenciled load limit on each end. (See Fig. 3.1, Sketch 1.)

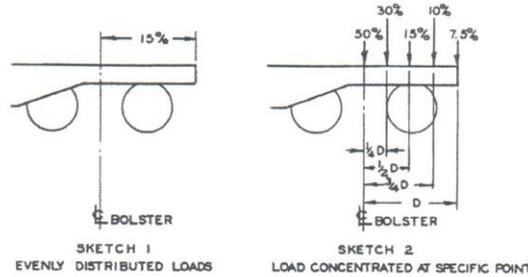


Fig. 3.1 Weight distribution from truck center to end sill

3.4.1.5.2 Point or concentrated loading between body bolster and end sill must not exceed the percentages shown in Table 3.1. (See Fig. 3.1, Sketch 2.)

Table 3.1 Load concentration between body bolster and end sill

Location of Load or Bearing Piece	Permissible Concentrated Load Percentage of Stenciled Load Limit
C/L of bolster	50%
1/4 distance between bolster center and end sill	30%
1/2 distance between bolster center and end sill	15%
3/4 distance between bolster center and end sill	10%
At end sill	7.5%

### 3.4.2 Ballast

3.4.2.1 If the weight of a load cannot be equally distributed across a car, suitable ballast must be used to equalize the weight. The counterweight ballast must be secured in accordance with General Rule 5. The weight of the counterweight and its securement must be considered part of the total load weight and meet proper load distribution requirements

3.4.2.2 To determine how much ballast is required to balance the load, take the weight of the load in pounds (W); multiply it by the distance of the center of gravity from the centerline of the load relative to the centerline of the railcar in inches (D); and divide by the distance in inches (d) available on the car to offset the imbalance.

$$\text{Weight of ballast} = \frac{W \times D}{d}$$

3.4.2.3 To determine the location of the given weight of the ballast in pounds (w) to offset the imbalance, take the weight of the load in pounds (W); multiply it by the distance of the center of gravity of the load relative to the centerline of the railcar in inches (D); and divide by the ballast weight in pounds.

$$\text{Location of ballast from centerline of car} = \frac{W \times D}{w}$$

**3.4.3 Securement**

3.4.3.1 Regardless of the vacant space across a car, the load must be secured to prevent any portion of the load from shifting, resulting in a potential off-balance condition and/or displacement of the load from the car.

3.4.3.2 Unless otherwise specified in a figure, all tubular products in the same layer must be of the same height. Not applicable for loads with maximum height below top of gondola car sides.

3.4.3.3 Machines and other items having high centers of gravity or narrow bases must be secured to ensure their stability in transit.

3.4.3.4 Partial unloading of a commodity from a car is not recommended. In the event that a load is partially unloaded, the remainder of the load on the car must comply with, or be arranged to comply with, an existing figure or the General Rules before further movement.

**3.4.4 General Load Distribution**

3.4.4.1 For proper load distribution on general service cars only, the percentages of stenciled load weight limits listed under this rule must not be exceeded unless the car owner has otherwise designated, either by note in the Official Equipment Register that these percentages may be changed or by providing specific permission in writing.

3.4.4.2 When the load is lapped or staggered between truck centers and covers about the full length of the car and the weight of the load does not exceed the stenciled load limit of the car, the requirements of Rule 3.4.4.1 do not apply.

3.4.4.3 Fig. 3.2 applies to all flatcars built after January 1, 1965, including flatcars equipped with both fish-belly center sills and fish-belly side sills.

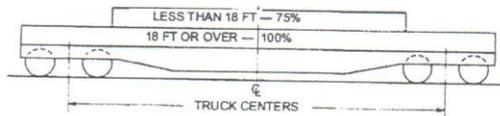


Fig. 3.2 Flatcars built after January 1, 1965

3.4.4.4 Fig. 3.3 applies to all flatcars built prior to January 1, 1965, except flatcars equipped with both fish-belly center sills and fish-belly side sills.

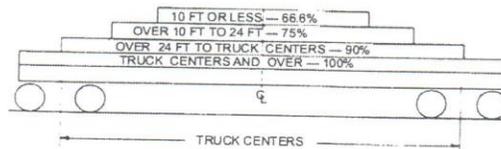


Fig. 3.3 Flatcars built before January 1, 1965

3.4.4.5 Fig. 3.4 applies to all gondola cars.

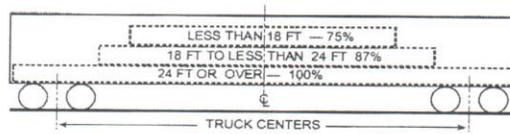


Fig. 3.4 Gondola load distribution

3.4.4.6 The weight concentration percentages shown in the figures under Rule 3.4.4.1 are based on the center of load weight (that is, the center of gravity of the load) being located on the center of the car length. The center of the load weight must not be nearer to either truck center than the distances shown in Table 3.2 based on the corresponding reduction in load weight. These distances are calculated so as not to exceed one half the load weight at either truck.

Table 3.2 Positioning load weight center

When load weight is reduced to...	Position of load weight center should be...
66.6%	1/4 distance between truck centers.
75%	1/3 distance between truck centers.
87%	3/7 distance between truck centers.
90%	9/20 distance between truck centers.

3.4.4.7 The distance between crosswise bearing pieces (center to center) under lapped or staggered portion must be placed so as to prevent excessive concentration of weight over specified spaces shown in the above tables.

3.4.4.8 It is permissible to provide for extended load distribution by using bearing pieces that are of suitable strength and length, placed lengthwise of car to distribute the load weight over the spaces specified in Table 3.2.

3.4.4.9 When crosswise bearing pieces are used, the distance between the outside bearing pieces (center to center) must not be less than the minimum distance specified in the above tables.

3.4.4.10 When a load is prepared on two or more cars, with or without overhanging support, the weight carried on one bearing piece is not to exceed the percentage of stenciled load weight limit, as shown in General Rule 30, Tables 30.3 through 30.14, depending on the class of car as shown in the tables.

### 3.5 Load Distribution—Center Beam Flatcars

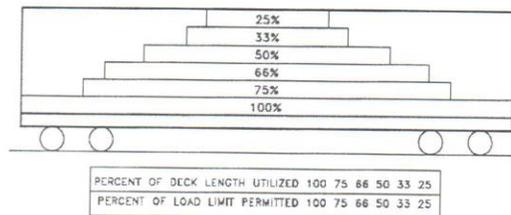


Fig. 3.5 Load distribution on typical center beam flatcar

3.5.1 Fig. 3.5 refers only to cars originally constructed as center beam cars.

3.5.2 The center beam flatcar is not a general purpose flatcar. Therefore, if the full length of the deck is not utilized, loads must be reduced in accordance with Fig. 3.5, except where stenciling on the car indicates car construction is capable to withstand load concentrations over less than the full deck length or permission is given by carrier and car owner.

3.5.3 Any loading not covered by a specific figure must be approved by the originating carrier as covered in Rule 1.3.

3.5.4 Load must be equally distributed on both sides of the center beam partition.

### 3.6 Load Distribution—Gondola Cars

Regardless of the amount of vacant lateral space on the car, the load must be secured so as to prevent moving or tipping toward the sides of the car. Exceptions to this rule are allowed only where specified in approved figures.

### 3.7 Load Distribution—Hopper Cars

Load weight must be evenly distributed side to side. If the mounding of loaded material presents the potential for violating this even distribution should it settle to one side of the car or the other, the height of mound must be reduced accordingly.

### 3.8 Load Distribution—Trailers and Containers

3.8.1 The weight of lading and trailer must not exceed regulatory requirements for North American highway transport.

3.8.2 Trailers are designed for uniform load distribution. Lading must be distributed equally between the rear tires and the fifth wheel. Concentrated loads must be positioned over rear wheels first and then over fifth wheel if needed.

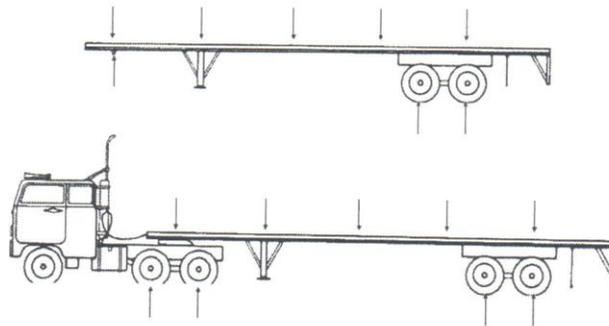


Fig. 3.6 Weight distribution on trailer

3.8.3 Crosswise weight must be equally distributed.

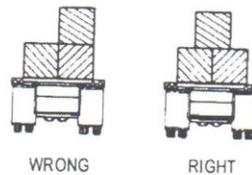


Fig. 3.7 Crosswise weight distribution on trailer

3.8.4 The figures in Part 3 and Part 4 of Section 7 of the Open Top Loading Rules illustrate the securement items and do not necessarily show the correct weight distribution to comply with Rule 3.8, which shall govern.

3.8.5 The load must be located so that the weight along both sides of the trailer is equal for the entire length of the load. If the weight of a load cannot be equally distributed across the trailer, suitable ballast must be used to equalize the weight. The counterweight ballast must be secured in accordance with Rule 5.3 of this Part. The weight of the counterweight and its securement must be considered part of the total load weight.

3.8.6 Regardless of the vacant space across a trailer, the load must be secured to prevent any portion of the load from shifting, resulting in a potential off-balance condition and/or displacement of the load from the trailer.

3.8.7 Large and heavy material such as ingots, slabs, billets, molds, castings, machines, etc., not covered by individual figures, must be loaded with the largest dimension on the bottom for greater stability.

3.8.8 Unless otherwise specified in a figure, all tubular products in the same layer must be of the same height.

3.8.9 Machines and other items having high centers of gravity or narrow bases must be secured to ensure their stability in transit.

3.8.10 Partial unloading of a commodity from a trailer is not recommended. In the event that a load is partially unloaded, the remainder of the load on the trailer must comply with, or be arranged to comply with, an existing figure or the General Rules before further movement.

#### 4. LOAD DIMENSION AND WEIGHT RESTRICTIONS

4.1 The height, width, and length of a load on one car for unrestricted movement must be within the "Outline Diagram for Single Loads, Without End Overhang, On Open Top Cars" as published in the "Railway Line Clearance" section of the *Official Railway Guide*, and in Appendix A, page 185.

4.2 Refer to Part 5 for recommended procedures for measuring loads that exceed published railway line clearances and the method of determining combined center of gravity above top of rail.

4.3 Loads of dimensions and/or weight that make it necessary to handle them under restricted speeds must be reported by the originating carrier to all carriers involved in the shipment's routing.

4.4 The dimensions for single loads having end overhang, and those loaded on two or three cars, must be in compliance with General Rules 29 and 30.

4.5 Loading tracked machinery/vehicles with treads extending (laterally) beyond the floor of the car is permitted, provided the machine/vehicle is centrally located on the car and not more than one half of the tread extends beyond the outside face of the side sill.

4.6 Shippers and originating carriers must verify clearances over the entire route for any load having one or more dimensions exceeding the above-referenced outline diagram or as shown in General Rules 29 and 30. This rule does not authorize shippers to exceed height, width, or length dimensions when shown in specific figures.

##### 4.7 Trailers with Load Overhang

Loads that are longer than the trailer must be within the following limitations for load overhang.

4.7.1 The overhang must not project beyond the end sill of the flatcar on which the trailer is loaded unless an idler car is used.

4.7.2 The length of the overhang measured from the end of the trailer (or end bearing piece when used) is not to exceed 25% of the length of the load. If the load consists of more than one pile, the 25% limitation applies to the length of the end pile containing the overhang. Individual pieces not exceeding 10% of the total number of overhanging pieces in the load may exceed the 25% overhang limit if all other conditions are met.

4.7.3 The length of the overhang, even within the 25% limit, shall be of such length as not to produce injurious bending or deformation of the load or pieces in the load because of weight or conditions incidental to TOFC movements. The length of the overhang in this case will depend upon the weight, cross section, and strength of the material in the load.

4.7.4 For any objects subject to rotating or swinging, refer to Rule Rule 6.

#### 5. LOAD RESTRAINT

##### 5.1 Load Restraint Types

###### 5.1.1 Floor Blocking

Lumber or steel dunnage is secured to the railcar via fasteners (nails or bolts) or fastening agents (weld). The primary purpose is to prevent movement of the load on the car by blocking around points or perimeter of the load.

###### 5.1.2 Tie-Downs

Tie-downs can be any material (cable, rod, strap, chain, flat bar) used to generally secure the load above the floor to an anchoring point on the car.