Roll Paper Load Pattern Creation 101

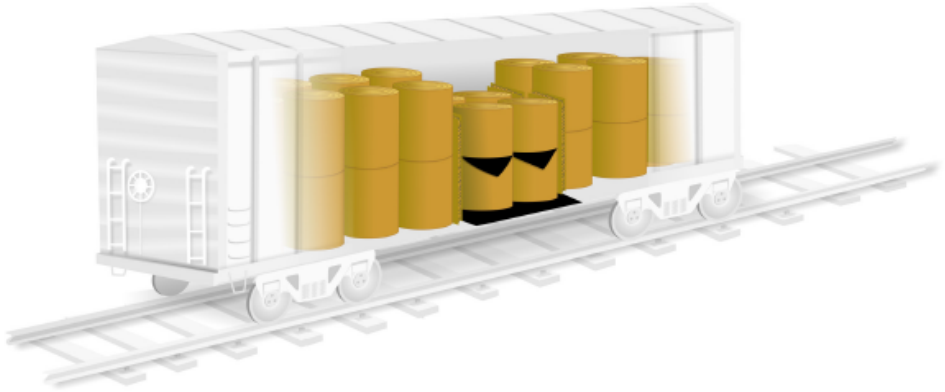
ASSOCIATION OF AMERICAN RAILROADS

Closed Car Loading Guide

Part 2

Best Practices for Loading

Roll Paper in Railcars



Circular 42-M

(Supersedes Circular No. 42-L)

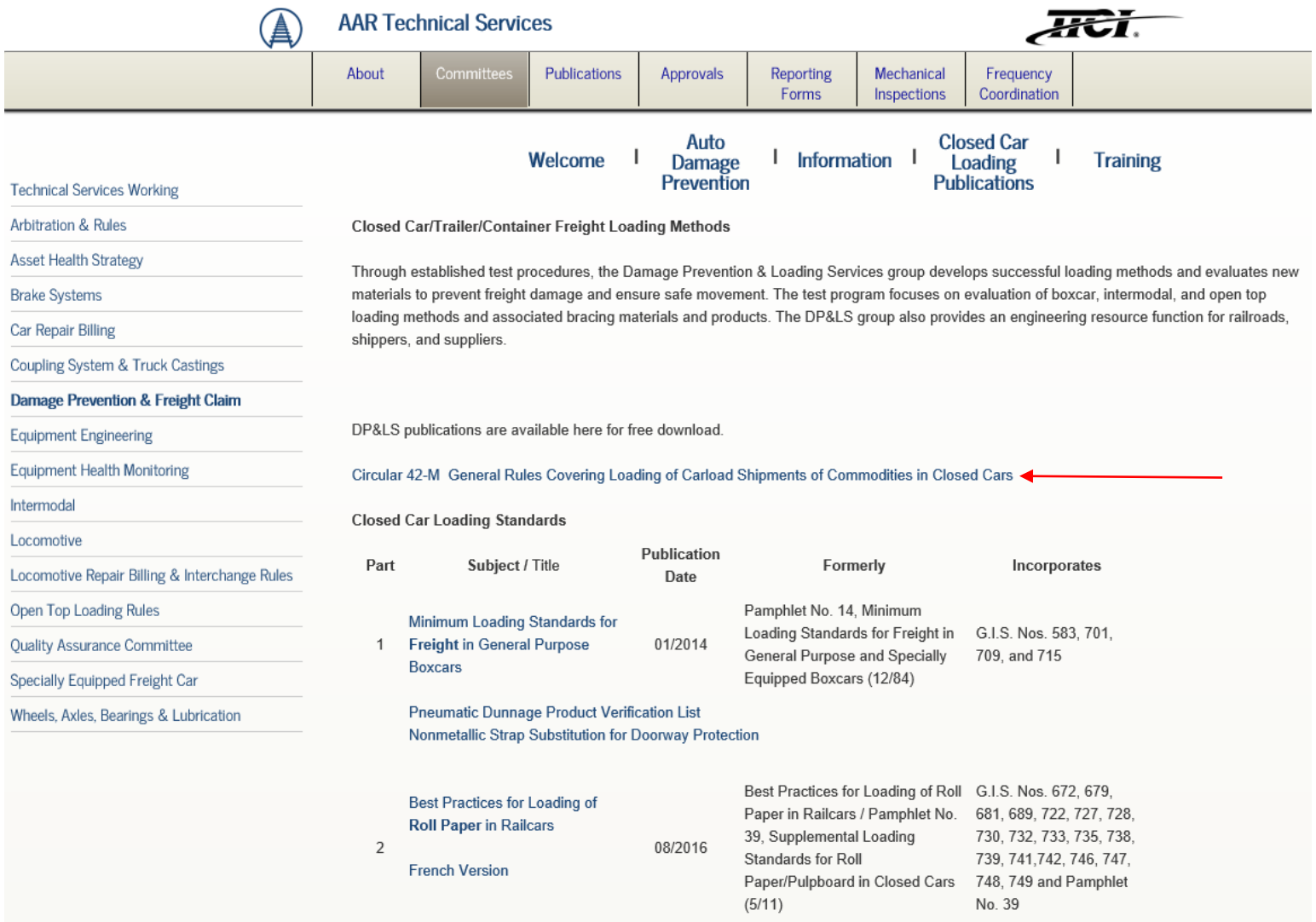
GENERAL RULES GOVERNING THE LOADING OF CARLOAD SHIPMENTS OF COMMODITIES IN CLOSED CARS

Topics for Discussion

- Finding The Best Practices, 42-M, and GIS Updates on AAR website
- 58” Diameter Rolls in 50 ft. Car
- 58” Diameter Rolls in 60 ft. Car
- 58” Diameter Rolls with an Incomplete Second Layer
- Center of Gravity Calculation

AAR Circular 42-M

https://aar.com/standards/damage-publications.php



AAR Technical Services

About | Committees | Publications | Approvals | Reporting Forms | Mechanical Inspections | Frequency Coordination

Welcome | Auto Damage Prevention | Information | Closed Car Loading Publications | Training

- Technical Services Working
- Arbitration & Rules
- Asset Health Strategy
- Brake Systems
- Car Repair Billing
- Coupling System & Truck Castings
- **Damage Prevention & Freight Claim**
- Equipment Engineering
- Equipment Health Monitoring
- Intermodal
- Locomotive
- Locomotive Repair Billing & Interchange Rules
- Open Top Loading Rules
- Quality Assurance Committee
- Specially Equipped Freight Car
- Wheels, Axles, Bearings & Lubrication

Closed Car/Trailer/Container Freight Loading Methods

Through established test procedures, the Damage Prevention & Loading Services group develops successful loading methods and evaluates new materials to prevent freight damage and ensure safe movement. The test program focuses on evaluation of boxcar, intermodal, and open top loading methods and associated bracing materials and products. The DP&LS group also provides an engineering resource function for railroads, shippers, and suppliers.

DP&LS publications are available here for free download.

Circular 42-M General Rules Covering Loading of Carload Shipments of Commodities in Closed Cars

Closed Car Loading Standards

Part	Subject / Title	Publication Date	Formerly	Incorporates
1	Minimum Loading Standards for Freight in General Purpose Boxcars Pneumatic Dunnage Product Verification List Nonmetallic Strap Substitution for Doorway Protection	01/2014	Pamphlet No. 14, Minimum Loading Standards for Freight in General Purpose and Specially Equipped Boxcars (12/84)	G.I.S. Nos. 583, 701, 709, and 715
2	Best Practices for Loading of Roll Paper in Railcars French Version	08/2016	Best Practices for Loading of Roll Paper in Railcars / Pamphlet No. 39, Supplemental Loading Standards for Roll Paper/Pulpboard in Closed Cars (5/11)	G.I.S. Nos. 672, 679, 681, 689, 722, 727, 728, 730, 732, 733, 735, 738, 739, 741,742, 746, 747, 748, 749 and Pamphlet No. 39

AAR Circular 42-M

Circular 42-M

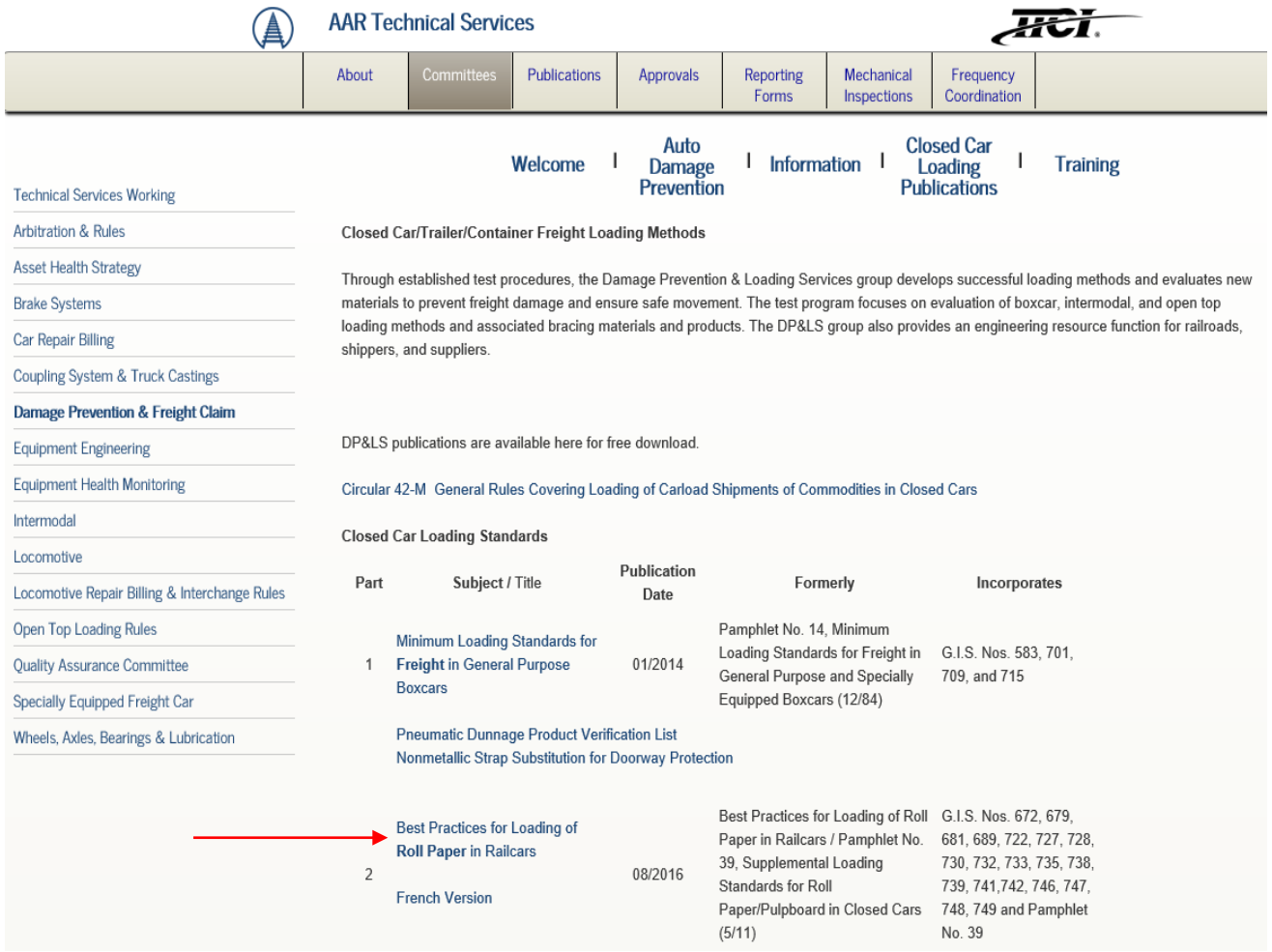
(Supersedes Circular No. 42-L)

GENERAL RULES GOVERNING THE LOADING OF CARLOAD SHIPMENTS OF COMMODITIES IN CLOSED CARS

- Inspection and Selection of Cars
- Maximum Load Weight
- Lengthwise Distribution of Weight
- Crosswise Distribution of Weight
- Loading, Blocking, and Bracing
- Doorway Protection
- Center of Gravity
- Special Equipment
- Opening and Closing of Doors

CCLG Part 2 - Best Practices for Loading Roll Paper

https://aar.com/standards/damage-publications.php



AAR Technical Services

About | Committees | Publications | Approvals | Reporting Forms | Mechanical Inspections | Frequency Coordination

Welcome | Auto Damage Prevention | Information | Closed Car Loading Publications | Training

- Technical Services Working
- Arbitration & Rules
- Asset Health Strategy
- Brake Systems
- Car Repair Billing
- Coupling System & Truck Castings
- **Damage Prevention & Freight Claim**
- Equipment Engineering
- Equipment Health Monitoring
- Intermodal
- Locomotive
- Locomotive Repair Billing & Interchange Rules
- Open Top Loading Rules
- Quality Assurance Committee
- Specially Equipped Freight Car
- Wheels, Axles, Bearings & Lubrication

Closed Car/Trailer/Container Freight Loading Methods

Through established test procedures, the Damage Prevention & Loading Services group develops successful loading methods and evaluates new materials to prevent freight damage and ensure safe movement. The test program focuses on evaluation of boxcar, intermodal, and open top loading methods and associated bracing materials and products. The DP&LS group also provides an engineering resource function for railroads, shippers, and suppliers.

DP&LS publications are available here for free download.

Circular 42-M General Rules Covering Loading of Carload Shipments of Commodities in Closed Cars

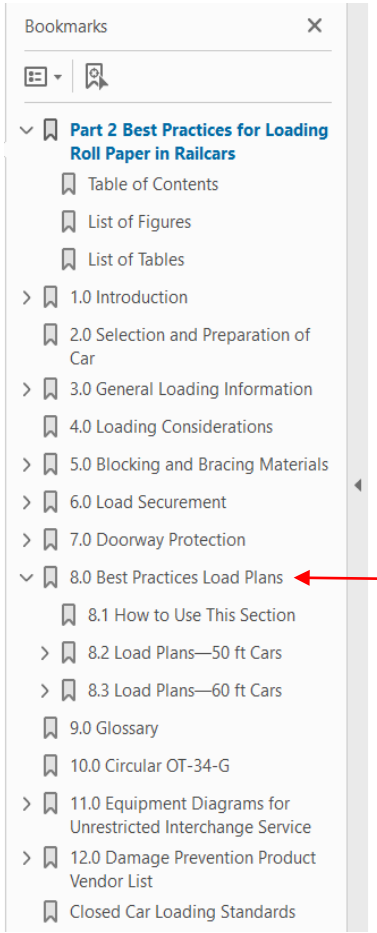
Closed Car Loading Standards

Part	Subject / Title	Publication Date	Formerly	Incorporates
1	Minimum Loading Standards for **Freight** in General Purpose Boxcars	01/2014	Pamphlet No. 14, Minimum Loading Standards for Freight in General Purpose and Specially Equipped Boxcars (12/84)	G.I.S. Nos. 583, 701, 709, and 715
	Pneumatic Dunnage Product Verification List			
	Nonmetallic Strap Substitution for Doorway Protection			
2	Best Practices for Loading of **Roll Paper** in Railcars	08/2016	Best Practices for Loading of Roll Paper in Railcars / Pamphlet No. 39, Supplemental Loading Standards for Roll Paper/Pulpboard in Closed Cars (5/11)	G.I.S. Nos. 672, 679, 681, 689, 722, 727, 728, 730, 732, 733, 735, 738, 739, 741,742, 746, 747, 748, 749 and Pamphlet No. 39
	French Version			

GIS Updates:

749 50 in. Diameter Roll Paperboard in 50 ft. Cushioned Boxcars with Horizontal Airbags (8/16)
752 Large Diameter Paper Rolls in 60 ft. Cushioned Boxcars with Single Plug Doors and Anchored Straps (10/16)
753 60 in. Diameter Roll Paperboard in 60 ft. Cushioned Boxcars with Doorway Stacks on Risers (10/16)
758 58 in. Diameter Roll Pulpboard in Boxcars with an Incomplete Second Layer Loaded on End (2/17)
761 37 in. Diameter Plastic Stretch Wrapped Kraft Rolls Loaded in a Single Layer in 60 ft. Cushioned Boxcars Using Rubber Mats and Lengthwise Filler Panels (3/17)
766 45 in. Diameter Roll Paper in 60 ft. Cushioned Boxcars with Double Plug Doors (8/17)
769 42 in. Diameter Roll Paper Loaded in 60 ft. Cushioned Boxcars Using Rubber Mats and and Airbags (9/17)
770 48 in. Diameter Roll Paper Loaded in 50 ft. Cushioned Boxcars Using Horizontal Airbags (9/17)
771 50 in. Diameter Roll Paper Loaded in 50 ft. Cushioned Boxcars Using Sidewall Fillers and Horizontal Airbags (10/17)
772 81 in. Diameter Roll Paper in 50 ft. Standard Draft Gear Boxcars with Sliding Doors (10/17)
773 42 in. Diameter Roll Paper in 50 ft. Cushioned Boxcars with 10 ft. Doors (revised 6/18 - 10/17)
774 48 in. Diameter Roll Paper in 60 ft. Cushioned Boxcars with 16 ft. Double Doors (12/17)
776 45 in. Diameter Roll Paper in 50 ft. Cushioned Boxcars with up to 12 ft. Doors (2/18)
788 60 in. Diameter Roll Paperboard in 60 ft. Cushioned Boxcars with 12 ft. Wide Plug Doors (6/18)
790 58 in. Diameter Roll Paperboard in 50 ft. Cushioned Boxcars with 12 ft. Wide Plug Doors (6/18)
796 58 in. Diameter Roll Pulpboard with an Incomplete Second Layer (10/18)
801 49 in. Diameter Roll Paper in 52 ft. Cushioned Boxcars with 12 ft. Wide Plug Doors (12/18)
802 58 in. Diameter Paper Rolls T-Loaded in 60 ft. Boxcars with 16 ft. Wide Double Plug Doors Using Lengthwise Filler Panels (12/18)
804 Lengthwise Void Filler Panels in Rigidly Braced Roll Paper Load Securement (2/19)
807 54 in. Diameter Roll Paper in 60 ft. Cushioned Boxcars with 16 ft. Wide Plug Doors (4/19)
808 45 in. Diameter Roll Paper Loaded in 50 ft. Cushioned Boxcars Using Horizontal Airbags (4/19)
812 49 in. Diameter Roll Paper Loaded in 50 ft. and 60 ft. Cushioned Boxcars Using Horizontal Airbags (6/19)
813 Roll Paperboard in Boxcars with Doorway Stacks on Risers and Rubber Mats (6/19)

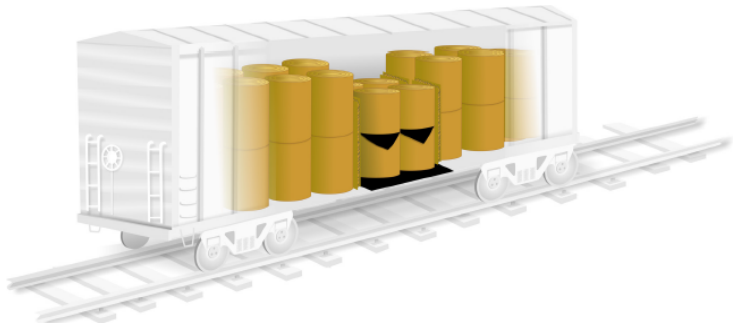
CCLG Part 2 - Best Practices for Loading Roll Paper in Railcars



ASSOCIATION OF AMERICAN RAILROADS

Closed Car Loading Guide

Part 2
Best Practices for
Loading
Roll Paper in Railcars



8.0 BEST PRACTICES LOAD PLANS

8.1 How to Use This Section

8.1.1 This section is divided into chapters defined by car size and roll diameter for the following combinations:

- 40 in., 42 in., 45 in., 50 in., 58 in., 60 in., and 72 in. diameter roll paper in 50 ft boxcars
- 40 in., 42 in., 45 in., 48 in., 50 in., 58 in., 60 in., 72 in., and 84 in. diameter roll paper in 60 ft boxcars

8.1.2 Each chapter begins with a reference table indicating car size, number of roll floor spots, and securement method. Each load plan number is hyperlinked for easy access, as are the paragraph reference numbers, which provide a link to detailed instructions specific to the securement method depicted.

8.1.3 Each loading method is in plan view with graphic symbols used to designate securement methods and materials. When doorway protection is required, the table associated with each load plan will specify the type, also hyperlinked. This table also identifies the railcar's suitable draft gear type, either standard or cushion underframe.

8.1.4 Hypertexted Links to Load Plans

8.2 Load Plans—50 ft Cars
8.2.1 50 ft Car—40 in. Diameter Rolls
8.2.2 50 ft Car—42 in. Diameter Rolls
8.2.3 50 ft Car—45 in. Diameter Rolls
8.2.4 50 ft Car—50 in. Diameter Rolls
8.2.5 50 ft Car—58 in. Diameter Rolls
8.2.6 50 ft Car—60 in. Diameter Rolls
8.2.7 50 ft Car—72 in. Diameter Rolls
8.3 Load Plans—60 ft Cars
8.3.1 60 ft Car—40 in. Diameter Rolls
8.3.2 60 ft Car—42 in. Diameter Rolls
8.3.3 60 ft Car—45 in. Diameter Rolls
8.3.4 60 ft Car—448 in. Diameter Rolls
8.3.5 60 ft Car—50 in. Diameter Rolls
8.3.6 60 ft Car—58 in. Diameter Rolls
8.3.7 60 ft Car—60 in. Diameter Rolls
8.3.8 60 ft Car—72 in. Diameter Rolls
8.3.9 60 ft Car—84 in. Diameter Rolls

CCLG Part 2 - Best Practices for Loading Roll Paper in Railcars

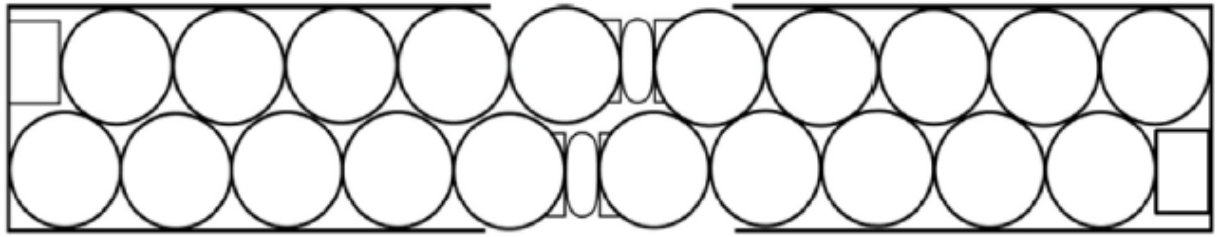
8.2.5 50 ft Car—58 in. Diameter Rolls

Load Plan Number	Car Size	Floor Spots	Securement	Paragraph Reference Number
8.2.5.1	50' 6" × 9' 2"	19 Roll	Vertical dunnage bags	5.6.7–5.6.9, 6.1
8.2.5.2	50' 6" × 9' 4"	20 Roll	Vertical dunnage bags	5.6.7–5.6.9, 6.1
8.2.5.3	50' 6" × 9' 6"	20 Roll	Vertical dunnage bags	5.6.7–5.6.9, 6.1
8.2.5.4	50' 6" × 9' 4"	20 Roll	Lumber or fiber filler	5.6.7–5.6.9
8.2.5.5	50' 6" × 9' 6"	20 Roll	Lumber or fiber filler	5.6.7–5.6.9
8.2.5.6	50' 6" × 9' 6"	20 Roll	Fiber filler with rubber mats	5.5.2, 5.6, 5.6.7– 5.6.9
8.2.5.7	50' 6" × 9' 6"	20 Roll	Fiber filler with rubber mats and air bags	5.5.2, 5.6, 5.6.7– 5.6.9, 6.1
8.2.5.8	50' 6" × 9' 6"	20 Roll	Fiber filler with rubber mats	5.5.1, 5.5.2, 5.6, 5.6.7– 5.6.9

58” Diameter Rolls in 50 ft. Car Load Plan 8.2.5.3

- Over view of load plan
- Hyperlinks to reference paragraphs
- Hyperlink to appropriate Doorway Protection methods

8.2.5.3 58 in. Diameter 50-6 × 9-6 Railcar Dunnage Bag Application 20 Floor Spots



Suitable Door Types	Doorway Protection	Maximum Door Width (ft)	Suitable Draft Gear Type
✓ Single sliding	7.2/7.4/7.5	12	✓ Cushion underframe
✓ Single plug	7.4/7.5/7.10.6	12	

Reference paragraphs 5.6.7, 5.6.8, 5.6.9, and 6.1

Reference Paragraphs – 5.6.7 and 5.6.8

5.6.7 In pulpboard loads, lengthwise voids can be taken up by using an end-wall spacer on the floor between the second roll loaded and the endwall of the car (see Figure 5.4). This prevents the rolls from bypassing each other and becoming wedged at the end of the car.

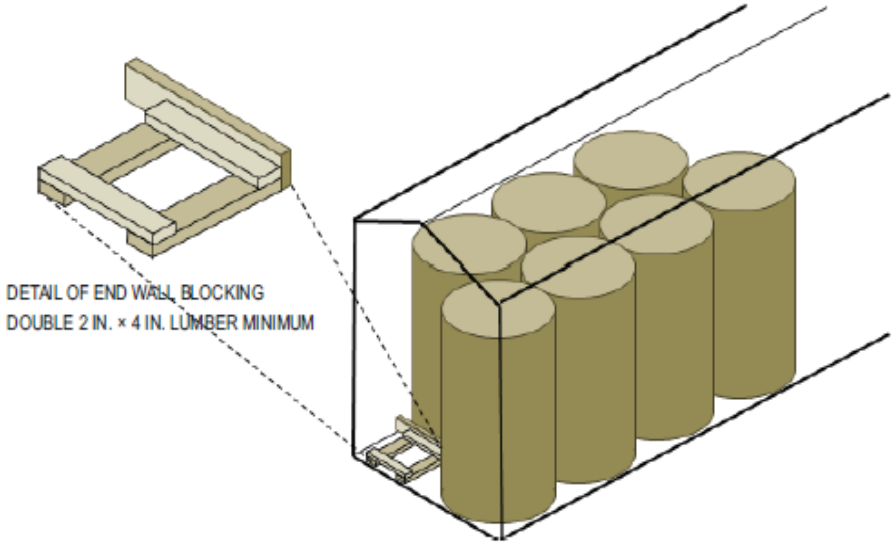


Figure 5.4 Endwall filler in pulpboard load

5.6.8 Another method of reducing lengthwise space in loads is to use honeycomb spacers on the sidewall of the car adjacent to the first roll loaded (see Figure 5.5). These fillers increase the offset in 1-1 offset patterns. The width of the panel must be at least 6 in. larger than one half of the adjacent roll diameter with a minimum height not less than one half the height of the adjacent roll and have a minimum crush strength of 2,250 lb/ft^2.

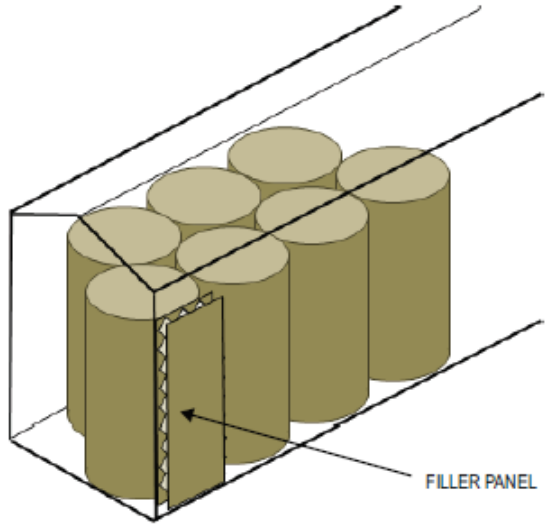


Figure 5.5 Honeycomb filler along sidewall in pulpboard load

Reference Paragraphs – 5.6.9 and 6.1

5.6.9 Wooden 2 × 4s and 2 × 6s also can be used to reduce lengthwise void space in cushion-equipped cars for single layer loads. Position wood fillers on the floor along the sidewall adjacent the endwall, and/or use them on the floor in the doorway area (see Figure 5.6). No more than three pieces may be used to fill any one lengthwise void.

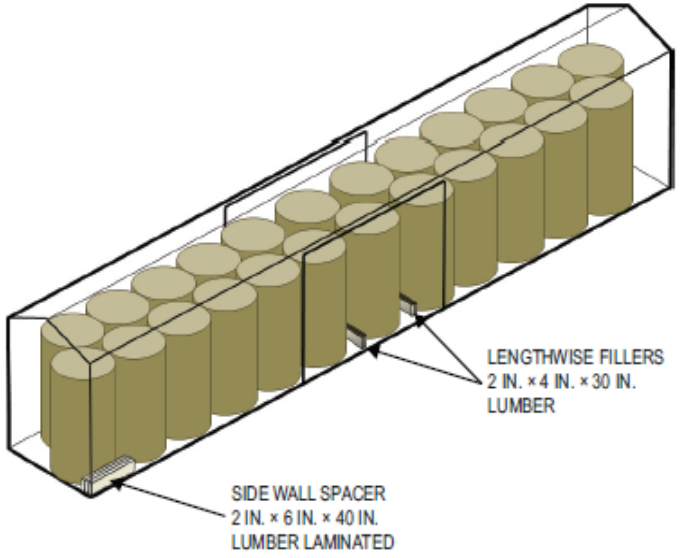


Figure 5.6 Wooden 2 × 4s and 2 × 6s used as lengthwise fillers in cushion equipped cars

6.1 Vertical Air Bags

6.1.1 Use bags to fill voids from 4 in. to 12 in. (after inflation, and not including rigid fillers) to ensure maximum performance.

6.1.2 Use bags of appropriate size and level for the weight of the load being secured. See Table 5.1.

6.1.3 Air bags should be a minimum of two-thirds the height of the adjacent stacks they are securing (before inflation). Air bag width should be not less than 12 in. less than the diameter of the adjacent roll. They should not exceed the height of the lading when positioned 1 in. above car floor. Center the bag in relation to roll width and height. Use one bag per row. See Table 5.1.

6.1.4 Use contour buffer pads as needed to provide a uniform load face for the air bag and to prevent bag displacement. See Figure 6.1.

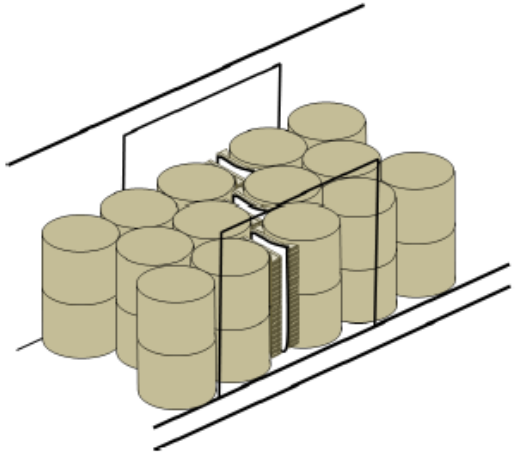


Figure 6.1 Vertical air bags application

Doorway Protection

7.5 Nonmetallic Strap

7.5.1 The Type 1A bonded/woven polyester straps listed in Table 7.1 have been tested and found acceptable for use as a substitute for 1¼- by 0.029-in. steel straps in doorway protection applications.

Table 7.1 Substitution rate for nonmetallic strap as doorway protection

Company/Size/Strap Designation	Grade	Application	Substitution Rate
Avistrap 1½ in. PW 120EH	4	Belt Type (Looped)	3 straps for each steel strap
Caristrap 1¼ in. 105WGSD	4	Conventional	4 straps for each steel strap
Caristrap 1¼ in. 105WGSD	4	Belt Type (Looped)	3 straps for each steel strap
Carolina Strapping 1¼ in. CS-2040	4	Belt Type (Looped)	3 straps for each steel strap
Carolina Strapping 1½ in. CS-2055	5	Belt Type (Looped)	2 straps for each steel strap
Cordstrap 1¼ in. CC 105	4	Belt Type (Looped)	3 straps for each steel strap
Tapex 1½ in. 125 WXXH	5	Belt Type (Looped)	2 straps for each steel strap
Southern Strapping 1¼ in. TY2AW 105	4	Belt Type (Looped)	3 straps for each steel strap
Caristrap Carilash AG50 Type 1A	7	Belt Type (Looped)	2 straps for each steel strap
Complete Packaging Systems CPS125 with ladder-type buckle G5-HDB12C	5	Belt Type (Looped)	2 straps for each steel strap
Complete Packaging Systems CPS105 with ladder-type buckle G5-HDB10C	4	Belt Type (Looped)	3 straps for each steel strap

NOTE: The application of nonmetallic straps as a substitute for 1¼ in. × 0.029 in. steel strap is restricted to maximum door openings of 10 ft in width.

7.5.2 Install straps across the door opening between the doorposts, as shown in Figure 7.4. Use the proper number of straps. Apply uniform tension to all straps so that all straps share the load equally. Distribute straps uniformly spaced vertically across the doorway.

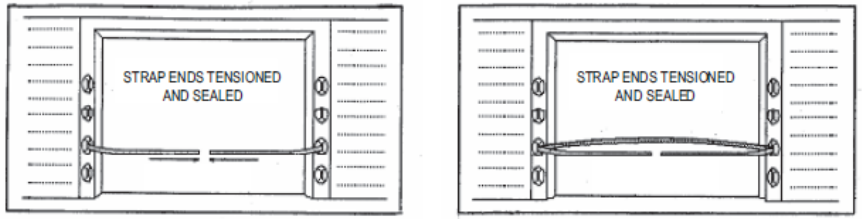


Figure 7.4 Conventional and belt-type strap applications

7.10.6 Rubber mat doorway protection is also approved for use in loads of 58-in.-diameter roll pulpboard loaded in a single layer in the doorway in a 1-1 offset pattern and utilizing airbags fillers to fill lengthwise void in the doorway area. Loads must have roll-to-roll centerline contact lengthwise in the car. Use side or end wall fillers, such as P blocks, to initiate pattern offset. Use this method only in boxcars with end-of-car cushioning.

- Filler panels shall be a minimum of 36 in. in width, and should extend to the full height of the adjacent stack of rolls. Use additional fillers as required for cars with 9 ft 7 in. inside width.
- Position rubber mats, 48 in. × 52 in. × 2 mm thick, to cover the area under the doorway rolls as shown in Figure 7.18. Do not overlap the doorway mats.
- Fold under the outer edge of the mats a minimum of 2 in. and load the doorway rolls on the mats.

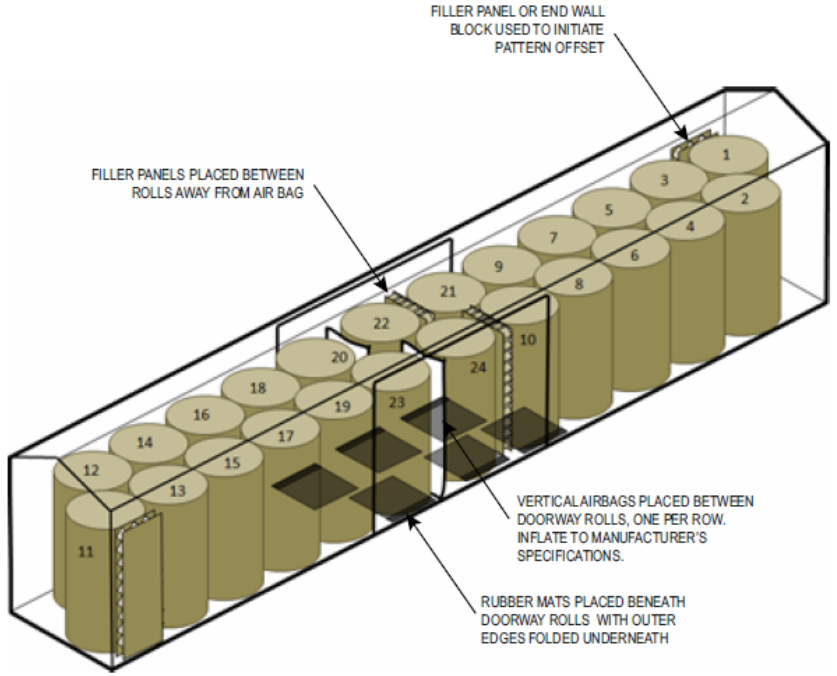


Figure 7.18 58-in.-diameter rolls in a 60 ft 9 in. boxcar with airbags for lengthwise fillers

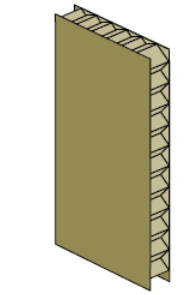
58” Diameter Rolls with an Incomplete Second Layer – G.I.S. 758

GIS Updates:

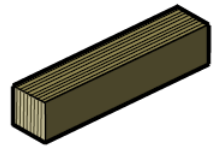
749 50 in. Diameter Roll Paperboard in 50 ft. Cushioned Boxcars with Horizontal Airbags (8/16)
752 Large Diameter Paper Rolls in 60 ft. Cushioned Boxcars with Single Plug Doors and Anchored Straps (10/16)
753 60 in. Diameter Roll Paperboard in 60 ft. Cushioned Boxcars with Doorway Stacks on Risers (10/16)
758 58 in. Diameter Roll Pulpboard in Boxcars with an Incomplete Second Layer Loaded on End (2/17)
761 37 in. Diameter Plastic Stretch Wrapped Kraft Rolls Loaded in a Single Layer in 60 ft. Cushioned Boxcars Using Rubber Mats and Lengthwise Filler Panels (3/17)
766 45 in. Diameter Roll Paper in 60 ft. Cushioned Boxcars with Double Plug Doors (8/17)
769 42 in. Diameter Roll Paper Loaded in 60 ft. Cushioned Boxcars Using Rubber Mats and and Airbags (9/17)
770 48 in. Diameter Roll Paper Loaded in 50 ft. Cushioned Boxcars Using Horizontal Airbags (9/17)
771 50 in. Diameter Roll Paper Loaded in 50 ft. Cushioned Boxcars Using Sidewall Fillers and Horizontal Airbags (10/17)
772 81 in. Diameter Roll Paper in 50 ft. Standard Draft Gear Boxcars with Sliding Doors (10/17)
773 42 in. Diameter Roll Paper in 50 ft. Cushioned Boxcars with 10 ft. Doors (revised 6/18 - 10/17)
774 48 in. Diameter Roll Paper in 60 ft. Cushioned Boxcars with 16 ft. Double Doors (12/17)
776 45 in. Diameter Roll Paper in 50 ft. Cushioned Boxcars with up to 12 ft. Doors (2/18)
788 60 in. Diameter Roll Paperboard in 60 ft. Cushioned Boxcars with 12 ft. Wide Plug Doors (6/18)
790 58 in. Diameter Roll Paperboard in 50 ft. Cushioned Boxcars with 12 ft. Wide Plug Doors (6/18)
796 58 in. Diameter Roll Pulpboard with an Incomplete Second Layer (10/18)
801 49 in. Diameter Roll Paper in 52 ft. Cushioned Boxcars with 12 ft. Wide Plug Doors (12/18)
802 58 in. Diameter Paper Rolls T-Loaded in 60 ft. Boxcars with 16 ft. Wide Double Plug Doors Using Lengthwise Filler Panels (12/18)
804 Lengthwise Void Filler Panels in Rigidly Braced Roll Paper Load Securement (2/19)
807 54 in. Diameter Roll Paper in 60 ft. Cushioned Boxcars with 16 ft. Wide Plug Doors (4/19)
808 45 in. Diameter Roll Paper Loaded in 50 ft. Cushioned Boxcars Using Horizontal Airbags (4/19)
812 49 in. Diameter Roll Paper Loaded in 50 ft. and 60 ft. Cushioned Boxcars Using Horizontal Airbags (6/19)
813 Roll Paperboard in Boxcars with Doorway Stacks on Risers and Rubber Mats (6/19)

58” Diameter Rolls with an Incomplete Second Layer – G.I.S. 758

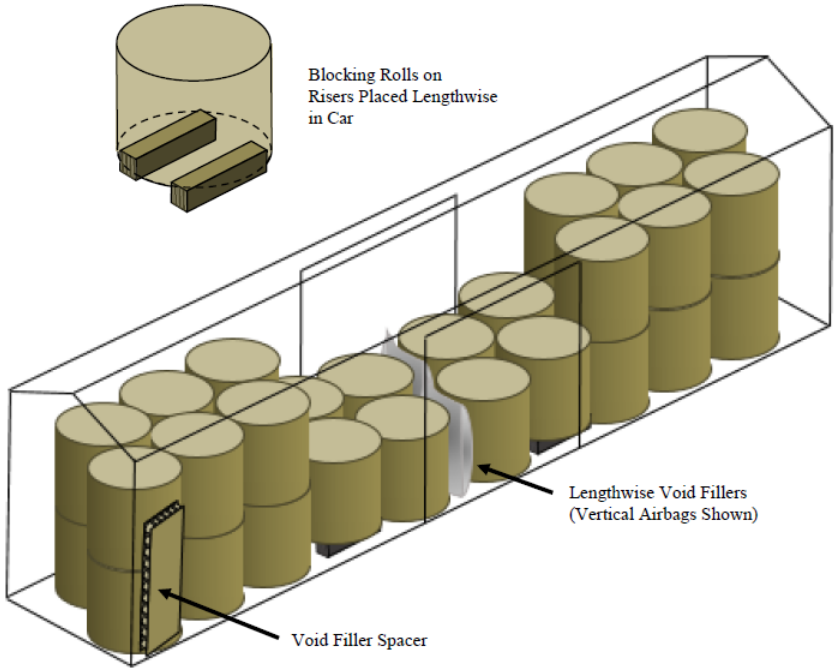
- Side wall spacers in opposite corners (lumber or void fillers)
- Blocking rolls extend minimum of 6 in. above top of first layer
- Doorway rolls not to be used as blocking rolls



Void Filler Spacer
Crush Strength - 2,250 lbs/ft²



Corrugated Riser
Crush Strength - 9,000 lbs/ft²



58” Diameter Rolls in 60 ft. Car

8.0 BEST PRACTICES LOAD PLANS

8.1 How to Use This Section

8.1.1 This section is divided into chapters defined by car size and roll diameter for the following combinations:

- 40 in., 42 in., 45 in., 50 in., 58 in., 60 in., and 72 in. diameter roll paper in 50 ft boxcars
- 40 in., 42 in., 45 in., 48 in., 50 in., 58 in., 60 in., 72 in., and 84 in. diameter roll paper in 60 ft boxcars

8.1.2 Each chapter begins with a reference table indicating car size, number of roll floor spots, and securement method. Each load plan number is hyperlinked for easy access, as are the paragraph reference numbers, which provide a link to detailed instructions specific to the securement method depicted.

8.1.3 Each loading method is in plan view with graphic symbols used to designate securement methods and materials. When doorway protection is required, the table associated with each load plan will specify the type, also hyperlinked. This table also identifies the railcar's suitable draft gear type, either standard or cushion underframe.

8.1.4 Hypertexted Links to Load Plans

8.2 Load Plans—50 ft Cars
- 8.2.1 50 ft Car—40 in. Diameter Rolls
- 8.2.2 50 ft Car—42 in. Diameter Rolls
- 8.2.3 50 ft Car—45 in. Diameter Rolls
- 8.2.4 50 ft Car—50 in. Diameter Rolls
- 8.2.5 50 ft Car—58 in. Diameter Rolls
- 8.2.6 50 ft Car—60 in. Diameter Rolls
- 8.2.7 50 ft Car—72 in. Diameter Rolls

8.3 Load Plans—60 ft Cars
- 8.3.1 60 ft Car—40 in. Diameter Rolls
- 8.3.2 60 ft Car—42 in. Diameter Rolls
- 8.3.3 60 ft Car—45 in. Diameter Rolls
- 8.3.4 60 ft Car—448 in. Diameter Rolls
- 8.3.5 60 ft Car—50 in. Diameter Rolls
- 8.3.6 60 ft Car—58 in. Diameter Rolls
- 8.3.7 60 ft Car—60 in. Diameter Rolls
- 8.3.8 60 ft Car—72 in. Diameter Rolls
- 8.3.9 60 ft Car—84 in. Diameter Rolls

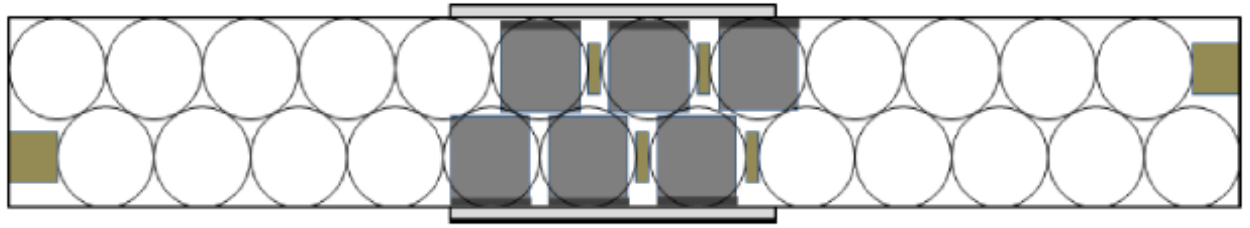
8.3.6 60 ft Car—58 in. Diameter Rolls

Load Plan Number	Car Size	Floor Spots	Securement	Paragraph Reference Number
8.3.6.1	60' 9" × 9' 6"	24 Roll	Vertical dunnage bag application	5.6.7–5.6.9, 6.1
8.3.6.2	60' 9" × 9' 6"	24 Roll	Vertical dunnage bag application with rubber mats	5.5.2, 5.6.7–5.6.9, 6.1
8.3.6.3	60' 9" × 9' 6"	24 Roll	Lumber or corrugated fiber spacer application	5.6.7–5.6.9
8.3.6.4	60' 9" × 9' 6"	24 Roll	Lumber or corrugated fiber spacer application	5.6.7–5.6.9
8.3.6.5	60' 9" × 9' 6"	24 Roll	Filler panel application with rubber mats	5.5.2, 5.6.7–5.6.9
8.3.6.6	60' 9" × 9' 6"	18 Roll	Anchored strap application	5.6.7–5.6.9, 6.7
8.3.6.7	60' 9" × 9' 6"	24 Roll	Vertical dunnage bag application with rubber mats	5.5.1, 5.5.2, 5.6, 5.6.7–5.6.9

58” Diameter Rolls in 60 ft. Car Load Plan 8.3.6.5

- Over view of load plan
- Hyperlinks to reference paragraphs
- Hyperlink to appropriate Doorway Protection method

8.3.6.5 58 in. Diameter 60-9 × 9-6 Railcar Filler Panel Application with Rubber Mats 24 Floor Spots

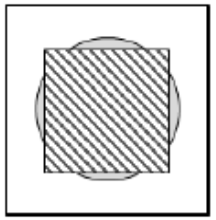


Suitable Door Types	Doorway Protection	Maximum Door Width (ft)	Suitable Draft Gear Type
✓ Single sliding	7.10	12	✓ Standard draft gear
✓ Double sliding	7.10	16	✓ Cushion underframe
✓ Single plug	No	12	
✓ Double plug	No	16	
✓ Combination	7.10	16	

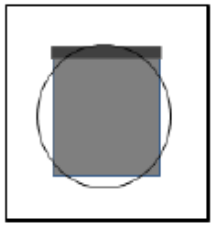
Reference paragraphs 5.5.2, 5.6.7, 5.6.8, and 5.6.9

Reference Paragraphs – 5.5.2 and 5.6.7

5.5.2 Rubber mats used as doorway protection should completely cover the floor of the car beneath the doorway rolls and have their outer edge folded under a minimum of 2 in. at the doorway. Do not overlap mats.



Rubber mat between rolls



Rubber mat beneath rolls with outer edge folded under

Figure 5.1 Rubber mat symbols

5.6.7 In pulpboard loads, lengthwise voids can be taken up by using an end-wall spacer on the floor between the second roll loaded and the endwall of the car (see Figure 5.4). This prevents the rolls from bypassing each other and becoming wedged at the end of the car.

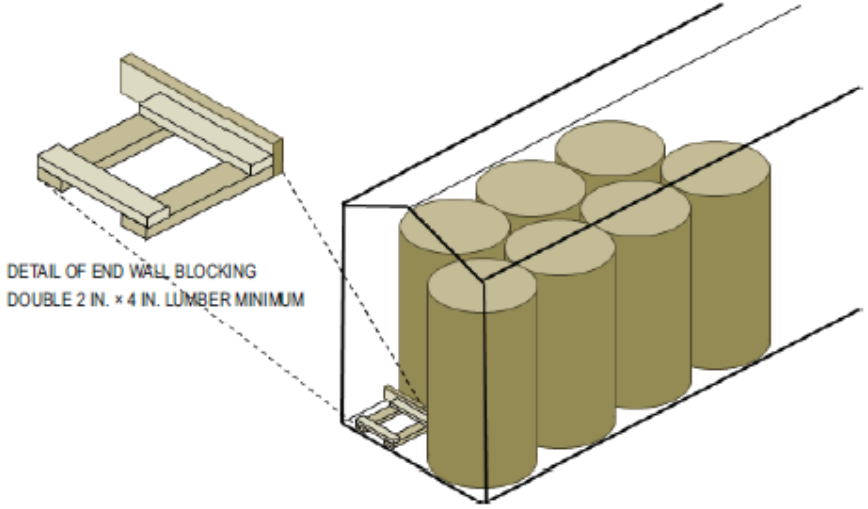


Figure 5.4 Endwall filler in pulpboard load

Reference Paragraphs – 5.6.8 and 5.6.9

5.6.8 Another method of reducing lengthwise space in loads is to use honeycomb spacers on the sidewall of the car adjacent to the first roll loaded (see Figure 5.5). These fillers increase the offset in 1-1 offset patterns. The width of the panel must be at least 6 in. larger than one half of the adjacent roll diameter with a minimum height not less than one half the height of the adjacent roll and have a minimum crush strength of 2,250 lb/ft².

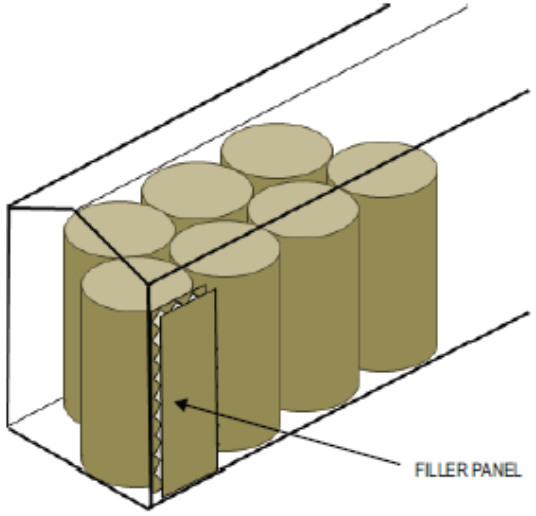


Figure 5.5 Honeycomb filler along sidewall in pulpboard load

5.6.9 Wooden 2 × 4s and 2 × 6s also can be used to reduce lengthwise void space in cushion-equipped cars for single layer loads. Position wood fillers on the floor along the sidewall adjacent the endwall, and/or use them on the floor in the doorway area (see Figure 5.6). No more than three pieces may be used to fill any one lengthwise void.

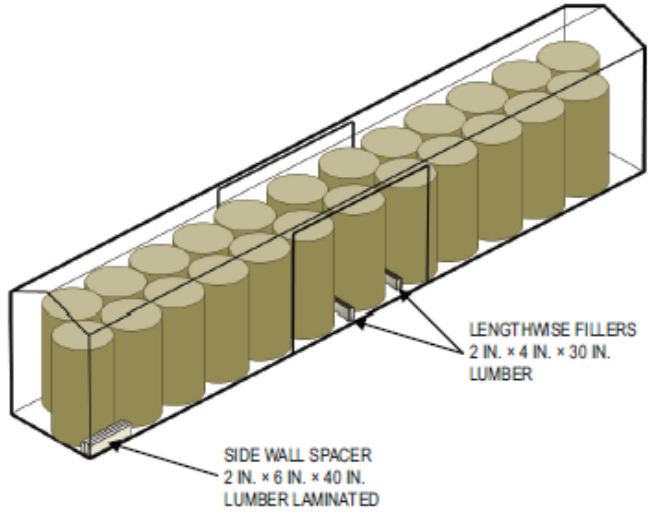


Figure 5.6 Wooden 2 × 4s and 2 × 6s used as lengthwise fillers in cushion equipped cars

Doorway Protection – 7.10

7.10 Rubber Mats

7.10.1 Rubber mat doorway protection is approved for use in loads of 58-in.-diameter roll pulpboard loaded in a 1-1 offset pattern and utilizing full-height longitudinal void fillers to fill lengthwise void in the doorway area. Loads must have roll-to-roll centerline contact lengthwise in the car. Use side or end wall fillers, such as P blocks, to initiate pattern offset.

7.10.2 This loading method was tested in boxcars having 50 ft 6 in. and 60 ft 9 in. inside lengths with 10-ft-wide single to 16-ft-wide double-plug and sliding doors.

7.10.3 Rubber mats 2 mm thick are positioned to cover the entire area under the doorway rolls as shown in Figure 7.17. Do not overlap the doorway mats.

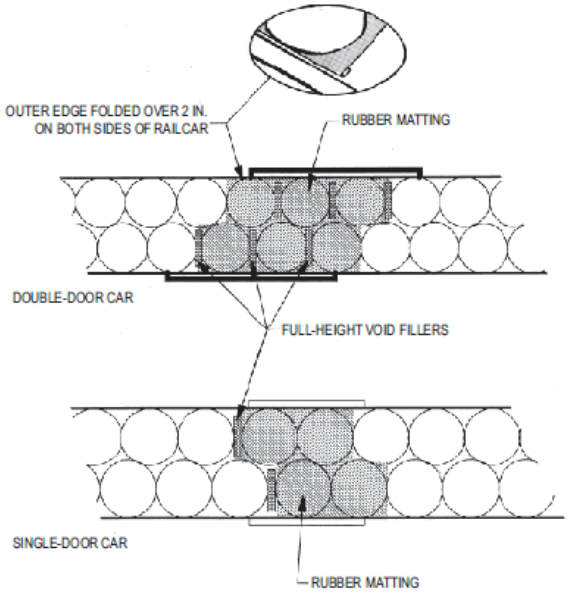


Figure 7.17 Rubber mat doorway protection

7.10.4 Fold the outer edge of the mats under a minimum of 2 in., and load the doorway rolls on the mats. Fill the remaining lengthwise void in the doorway area using full-height void fillers having crush strength of 2,250 lb/ft².

7.10.5 Rubber mat doorway protection is also approved for 60 in. diameter rolls of stretch-wrapped cellulose loaded in a 1-1 offset pattern and utilizing full-height longitudinal void fillers to fill lengthwise void in the doorway area. Do not use air bags for load securement with this doorway protection method. Use this method only in boxcars with end-of-car cushioning.

7.10.7 Rubber mat doorway protection is approved for use in loads of 58-in.-diameter roll pulpboard loaded in two layers in the doorway in a 1-1 offset pattern and utilizing full-height longitudinal void fillers to fill lengthwise void in the doorway area. Do not use air bags for load securement with this doorway protection method unless specified in an approved pattern. Loads must have roll-to-roll centerline contact lengthwise in the car. Use side or end wall fillers, such as P blocks, to initiate pattern offset. Use this method only in boxcars with end-of-car cushioning and single plug doors.

- Filler panels shall be a minimum of 36 in. in width, and should extend to the full height of the adjacent stack of rolls. Use additional fillers as required for cars with 9 ft 7 in. inside width.
- Position rubber mats, 48 in. × 52 in. × 2 mm thick, to cover the area under the doorway rolls as shown in Figure 7.19. Do not overlap the doorway mats.
- Fold under the outer edge of the mats a minimum of 2 in. and load the doorway rolls on the mats.

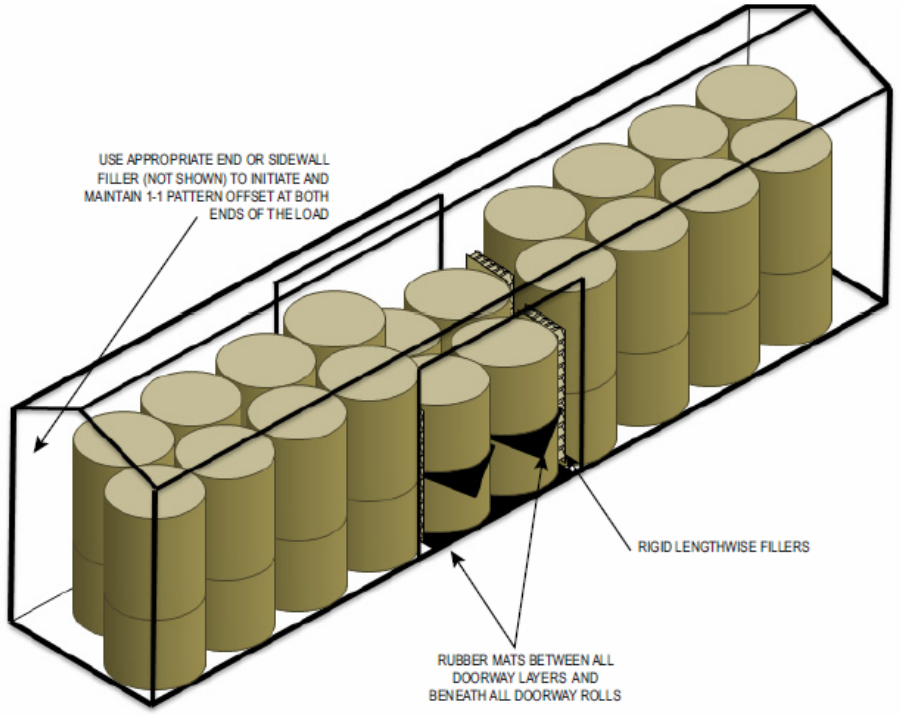


Figure 7.19 58-in.-diameter rolls loaded in two layers in a 60 ft 9 in. boxcar with rigid lengthwise fillers

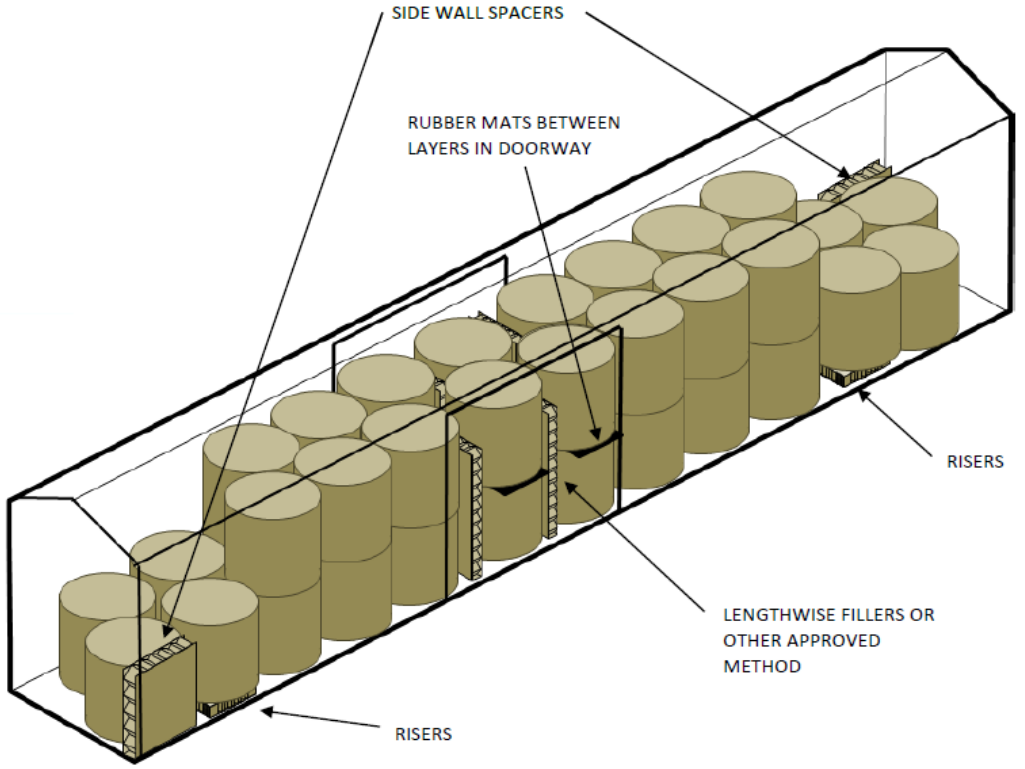
58” Diameter Rolls with an Incomplete Second Layer – G.I.S. 796

GIS Updates:

749 50 in. Diameter Roll Paperboard in 50 ft. Cushioned Boxcars with Horizontal Airbags (8/16)
752 Large Diameter Paper Rolls in 60 ft. Cushioned Boxcars with Single Plug Doors and Anchored Straps (10/16)
753 60 in. Diameter Roll Paperboard in 60 ft. Cushioned Boxcars with Doorway Stacks on Risers (10/16)
758 58 in. Diameter Roll Pulpboard in Boxcars with an Incomplete Second Layer Loaded on End (2/17)
761 37 in. Diameter Plastic Stretch Wrapped Kraft Rolls Loaded in a Single Layer in 60 ft. Cushioned Boxcars Using Rubber Mats and Lengthwise Filler Panels (3/17)
766 45 in. Diameter Roll Paper in 60 ft. Cushioned Boxcars with Double Plug Doors (8/17)
769 42 in. Diameter Roll Paper Loaded in 60 ft. Cushioned Boxcars Using Rubber Mats and and Airbags (9/17)
770 48 in. Diameter Roll Paper Loaded in 50 ft. Cushioned Boxcars Using Horizontal Airbags (9/17)
771 50 in. Diameter Roll Paper Loaded in 50 ft. Cushioned Boxcars Using Sidewall Fillers and Horizontal Airbags (10/17)
772 81 in. Diameter Roll Paper in 50 ft. Standard Draft Gear Boxcars with Sliding Doors (10/17)
773 42 in. Diameter Roll Paper in 50 ft. Cushioned Boxcars with 10 ft. Doors (revised 6/18 - 10/17)
774 48 in. Diameter Roll Paper in 60 ft. Cushioned Boxcars with 16 ft. Double Doors (12/17)
776 45 in. Diameter Roll Paper in 50 ft. Cushioned Boxcars with up to 12 ft. Doors (2/18)
788 60 in. Diameter Roll Paperboard in 60 ft. Cushioned Boxcars with 12 ft. Wide Plug Doors (6/18)
790 58 in. Diameter Roll Paperboard in 50 ft. Cushioned Boxcars with 12 ft. Wide Plug Doors (6/18)
796 58 in. Diameter Roll Pulpboard with an Incomplete Second Layer (10/18)
801 49 in. Diameter Roll Paper in 52 ft. Cushioned Boxcars with 12 ft. Wide Plug Doors (12/18)
802 58 in. Diameter Paper Rolls T-Loaded in 60 ft. Boxcars with 16 ft. Wide Double Plug Doors Using Lengthwise Filler Panels (12/18)
804 Lengthwise Void Filler Panels in Rigidly Braced Roll Paper Load Securement (2/19)
807 54 in. Diameter Roll Paper in 60 ft. Cushioned Boxcars with 16 ft. Wide Plug Doors (4/19)
808 45 in. Diameter Roll Paper Loaded in 50 ft. Cushioned Boxcars Using Horizontal Airbags (4/19)
812 49 in. Diameter Roll Paper Loaded in 50 ft. and 60 ft. Cushioned Boxcars Using Horizontal Airbags (6/19)
813 Roll Paperboard in Boxcars with Doorway Stacks on Risers and Rubber Mats (6/19)

58” Diameter Rolls with an Incomplete Second Layer – G.I.S. 796

- Risers used to step down load in each end of car
- Side wall spacers in opposite corners (lumber or void fillers)
- Incomplete second layer secured by blocking rolls
  - CCLG Part 2 Section 6.3.7



Securing Incomplete Layers with Blocking Rolls

6.3.7 With Blocking Rolls

6.3.7.1 If the roll width is less than or equal to the roll diameter, block incomplete layer by 25% of the roll width, or block a minimum of 6 in. and unitize or anchor the incomplete section.

6.3.7.2 If the roll width is greater than the roll diameter, block incomplete layer by 50% of the roll width, or block a minimum of 6 in. and unitize or anchor the incomplete section.

If...	**Then...**	**Else...**
Roll width is **less than or equal to** roll diameter	Block incomplete layer by 25% of roll width	Block with 6 in. riser and unitize or anchor.
Roll width is **greater than** roll diameter	Block incomplete layer by 50% of roll width	Block with 6 in. riser and unitize or anchor.

Center of Gravity

7. Center of Gravity

A. The combined center of gravity of a rail car and its contents must not exceed 98 in. above top of rail. In closed cars, there is no practical possibility of exceeding this center-of-gravity limitation except in cars that exceed Plate C dimensions. See AAR *Manual of Standards and Recommended Practices*, Section C, "Car Construction Fundamentals and Details."

B. Cars exceeding Plate C dimensions may extend to 17 ft above top of rail. Certain ladings, such as rolled paper, that are loaded two layers high may result in excessive combined center-of-gravity dimension. Shippers must calculate the combined center of gravity of the rail car and contents whenever any part of the load will exceed 11 ft 8 in. (140 in.) in height above the car floor. Shipper's tender of billing information for such cars to the origin carrier will signify compliance with this rule. Any questions on loading limitations in cars exceeding Plate C dimensions should be handled with the mechanical department of the origin carrier.

Use the following formula to calculate the combined center of gravity:

$$\text{Combined Center of Gravity (CG)} = \frac{(B \times E) + (D \times F)}{(E + F)}$$

where

A = Height of car floor above top of rail (in.)
B = Empty center of gravity of rail car above top of rail (in.), obtainable from car owner (Empty center of gravity may be stenciled on the rail car.)
C = Center of gravity of load above the car floor (in.)
D = Height of center of gravity of load above top of rail, equal to A+C
E = Lightweight of rail car (lb)
F = Weight of load (lb)

Center of Gravity Calculation

EXAMPLE: Roll Paper[a/]

Load: Seventy-seven 45 in. diameter × 50 in. wide rolls each weighing 2,500 lb, loaded in 29 floor spots with two complete layers plus 19 rolls in an incomplete third layer.

6 in. high risers are used to block the incomplete layer. Incomplete layer unitizing not shown.

NOTE: When loads consist of multiple sections or units having different unit heights and weights, each section or unit must be taken separately when calculating the CG of the load.

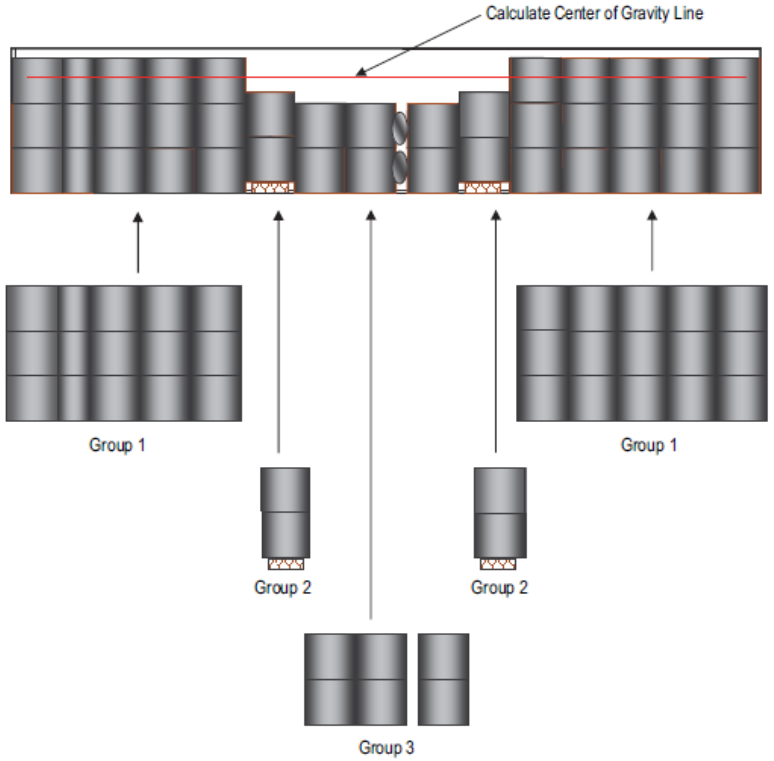


Figure 3: Side view of example load

All rolls in Group 1 would be considered a section of this multi-section load. All rolls in Group 2 would be considered a separate section, as would all rolls in Group 3. Riser height should also be added in when calculating the center of gravity for that section.

A = 44 in.

B = 58 in.

Group 1 = C1 = (50 in. × 3) / 2 = 75 in.

Group 2 = C2 = (50 in. × 2 + 6) / 2 = 53 in.

Group 3 = C3 = (50 in. × 2) / 2 = 50 in.

Group 1 = D1 = 75 in. + 44 in. = 119 in.

Group 2 = D2 = 53 in. + 44 in. = 97 in.

Group 3 = D3 = 50 in. + 44 in. = 94 in.

E = 72,800 lb

Group 1 = F1 = 19 rolls × 3 layers × 2,500 lb = 142,500 lb

Group 2 = F2 = 4 rolls × 2 layers × 2,500 lb = 20,000 lb

Group 3 = F3 = 6 rolls × 2 layers × 2,500 lb = 30,000 lb

$$\text{Combined CG} = \frac{(B \times E) + (D1 \times F1) + (D2 \times F2) + (D3 \times F3)}{E + F1 + F2 + F3}$$

$$= \frac{(58 \times 72,800) + (119.5 \times 142,500) + (97 \times 20,000) + (94 \times 30,000)}{72,800 + 142,500 + 20,000 + 30,000}$$

= 97.8 in. above top of rail (ATR)

Questions?