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Rules for Loading Long Materials

RULES GOVERNING

THE

Loading of Lumber and Timber on Open Cars,

AND

Loading and Carrying Structural Materials, Plates, Rails, Girders, Etc.

ADOPTED BY THE
MASTER CAR BUILDERS' ASSOCIATION
AS RECOMMENDED PRACTICE.

1896.

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1896.

RULES GOVERNING THE LOADING OF LUMBER AND TIMBER ON OPEN CARS.

The loading of all classes of lumber and timber on open cars must be in general conformity with the following diagrams.

MATERIAL LOADED ON A SINGLE CAR.



Fig. 1.

Material must be so loaded as to permit the brake at one end to be accessible and operative, and the lading at the other end must not project beyond the end of the car. Four stakes must be placed on each side of the car, and the tops of the opposite stakes must be held together by two boards, as specified. When the length of lumber will admit, it must be similarly loaded in two piles. The marked capacity of the car must not be exceeded.

LOADING PART CARS OF LUMBER NOT LESS THAN 40 AND NOT OVER 65 FEET LONG.

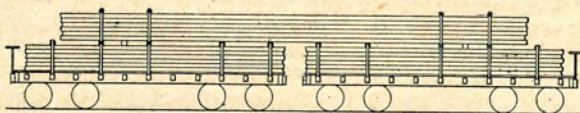


Fig. 2.

When long pieces are to be loaded on top of two cars of short pieces, they must rest on bearing pieces not less than 8 x 8 inches in section, securely fastened across the top lading of each car, and the stakes must extend up as shown and be securely fastened at the top and middle with wire, but the short stakes may be held together at the top with boards, as shown. The short lumber must be placed centrally on each car, and the bearing pieces must be placed between the stakes and as near the middle of the car as possible, with the following distances from center to center: for lumber 65 feet long, 43 feet; lumber 60 feet long, 40 feet; lumber 50 feet long, 35 feet; lumber 40 feet long, 30 feet. The maximum aggregate weight must not exceed ninety per cent of the marked capacity of the cars, and the amount of long lumber must not exceed one-half the lading.

MATERIAL NOT OVER 42 FEET LONG.



Fig. 3.

This material must be carried on one car, the second car being simply an idler. The latter must invariably be a flat car, while the car carrying the load may be either a flat car or a drop-end gondola. The five stakes on each side of the carrying car should be placed as near the bolsters as possible, and no stakes whatever should be used on the idler. All stakes should be fastened as described in the General Instructions, paragraph 7. The material on carrying car must rest on bearing pieces not less than 8 x 8 inches in section, and in length equal to the full width of the car, to prevent the lading from touching the idler, so that the cars can curve freely. These bearing pieces should be placed directly above the bolster, or as near to it as possible, but never between it and the end of the car. Should the idler be higher than the loaded car, the bearing pieces must be of sufficient thickness to keep the ends of lumber at least four (4) inches above the floor of the idler. The lading overhanging the idler must not project more than fifteen (15) feet from the center of the bearing piece, so that the ends will not project too far beyond the side of the car in curving. Short material may be loaded on the idler to the extent of two-thirds its marked capacity, and stakes secured in accordance with General Instructions, paragraph 7. There must be, however, a space of at least two (2) feet between the lading of the two cars. As the load on one truck of the carrying car is in excess of that on the other, and in direct proportion to load on bearing pieces and the overhang, care should be taken in all cases to load as near to the brake staff as possible, but leaving the brake accessible and operative. When loaded in this manner the following are the maximum lengths and weights which may be carried on cars of given length and capacity:

LENGTH OF CARS.	LENGTH OF LUMBER.	MAXIMUM WEIGHT OF LOAD.		
		Capacity of Cars, 40,000 lbs.	Capacity of Cars, 50,000 lbs.	Capacity of Cars, 60,000 lbs.
30 feet.....	30 feet.	38,000 lbs.	46,000 lbs.	57,000 lbs.
	32 "	35,000 "	42,000 "	53,000 "
	34 "	32,000 "	39,000 "	49,000 "
	36 "	30,000 "	37,000 "	45,000 "
32 feet.....	32 "	38,000 "	47,000 "	58,000 "
	34 "	35,000 "	44,000 "	54,000 "
	36 "	32,000 "	41,000 "	50,000 "
	38 "	30,000 "	38,000 "	47,000 "
34 feet.....	36 "	36,000 "	45,000 "	55,000 "
	38 "	34,000 "	42,000 "	51,000 "
	40 "	32,000 "	39,000 "	48,000 "
	42 "	30,000 "	37,000 "	45,000 "

MATERIAL 40 TO 70 FEET LONG.

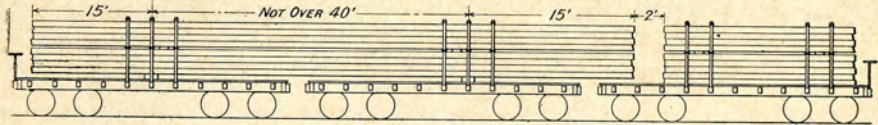


Fig. 4.



Fig. 5.

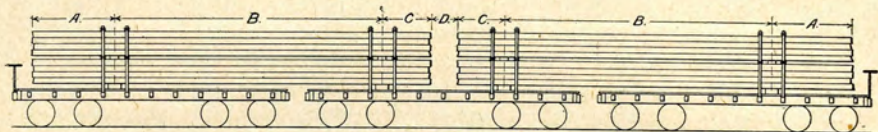


Fig. 6.

This material may be loaded on two or three cars of any length, as per Figs. 4, 5 or 6, according to the quantity and lengths of material to be loaded, provided that the two end brakes are kept accessible, and the same relative proportions in the spacing of bearing pieces, distance between ladings, and overhang of material are maintained, as per the following tables, which refer to Fig. 6 exclusively. The application of these tables will allow of the loading of lumber sixty feet long at one end and forty feet at the other, or with intermediate lengths; but when so loaded the maximum aggregate weight of load must be reduced to 10,000 lbs. less than given in the tables.

WHEN LOADED ON CARS 34 FEET LONG.					MARKED CAPACITY OF CARS.	MAXIMUM AGGREGATE WEIGHT TO BE CARRIED.
LENGTH OF LUMBER.	A	B	C	D		
40 ft.	10 ft. 3 in.	24 ft.	5 ft. 9 in.	10 ft.	40,000 lbs.	90,000 lbs.
45 ft.	11 ft. 9 in.	27 ft.	6 ft. 3 in.	6 ft. 6 in.		
50 ft.	13 ft.	30 ft.	7 ft.	2 ft. 6 in.		
60 ft.	17 ft.	33 ft.	10 ft.	2 ft.		
WHEN LOADED ON CARS 30 TO 32 FEET LONG.					50,000 lbs.	105,000 lbs.
40 ft.	10 ft. 3 in.	24 ft.	5 ft. 9 in.	8 ft.	60,000 lbs.	120,000 lbs.
45 ft.	11 ft. 9 in.	27 ft.	6 ft. 3 in.	4 ft.		

When loaded as per Figs. 4 or 5, the lading must not exceed two-thirds of the marked capacity of the two carrying cars. When loaded as per Fig. 4, short material may be loaded on the idler to the extent of two-thirds the marked carrying capacity of that car. The stakes should be fastened together, as described by General Instructions, paragraph 7, except that the short lading may be secured as described in Fig. 1.

MATERIAL 70 TO 100 FEET LONG.

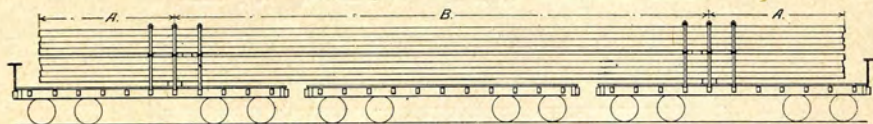


Fig 7.

This material must be loaded on three cars. The lading must rest on bearing pieces not less than 10 x 10 inches in section, placed equally distant from the center of bolster on both carrying cars, and the lading equally divided on them. There must be at least two stakes placed as near together as possible on each side of the carrying car, securely fastened together, as described in General Instructions, paragraph 7. These stakes should either be made of material eight (8) inches wide, and of sufficient thickness to fill the stake pockets, and gaged at the bottom so that they will extend on to the flooring of the car, or, after the standard stakes are in place, pieces 4 x 4 inches in section must be securely fastened to the inside of each stake. This narrows the space for lading eight (8) inches and permits a greater overhang, at both the ends and middle of the lading, without a dangerous projection beyond the sides of the cars when they are passing around curves. There must not be any stakes or bearing pieces used on the idler, and on no account must the lading be allowed to touch it. The following table of proportional distances between the bearing pieces, and the proper overhang for lumber of different lengths, must be observed; and when so loaded the maximum load for lumber of less than ninety (90) feet must not exceed one-half the marked capacity of the two end cars, but for lumber of ninety (90) feet and over, two-thirds of the marked capacity of these two cars will be allowed.

Length of lumber, 70 feet.....	A, 10 feet.	B, 50 feet.	A, 10 feet.
“ “ 80 “	A, 14 “	B, 52 “	A, 14 “
“ “ 90 “	A, 16 “	B, 58 “	A, 16 “
“ “ 100 “	A, 18 “	B, 64 “	A, 18 “

LOADING MATERIAL ON GONDOLAS.

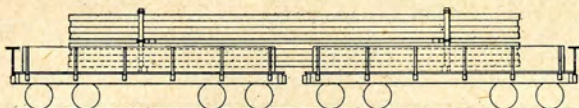


Fig. 8.

Long material may be loaded on gondola cars that have drop end-gates, provided, that when loaded on two cars, bearing pieces 8 x 8 inches are used to keep the lading clear of the end-gates and floor at least three (3) inches, and in addition to the bearing pieces on the floors there be placed two bearing pieces on each car not less than 8 x 8 inches in section, one on each side of the lading between the material and sides of the cars. These bearings must be placed in a vertical position and halved onto, and securely spiked to, the floor bearings in such a manner as to make the floor bearings serve as a brace between them, and fastened together as described by General Instructions, paragraph 7. Not more than two gondolas must be used together, and the lading must not exceed three-fourths the marked capacity of the cars.

CHAINING OF CARS WHEN LOADED WITH LONG LUMBER.

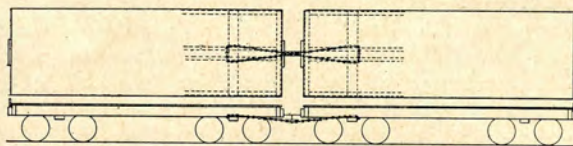


Fig. 9.

The use of chains is optional. On such roads as require their use, cars must be chained together with chains made of not less than three-quarter ($\frac{3}{4}$) inch iron passing over body bolsters and across under sills, forming a loop back of bolster and doubling to point of coupling between the two cars, as per Fig. 9, unless cars are provided with safety chains. These chains should be made as short as possible without taking the strain off of drawbars when springs are compressed. At interchange points chains will either be removed, or the receiving road will furnish the delivering road with chains of the same quality and dimensions as those received. When link and pin couplers are used, the slack of the link must be taken up by ordinary key blocks of hard wood driven into the link between the drawheads.

GENERAL INSTRUCTIONS.

1. When two or more cars have to be used to carry a lading, the consignee and destination of all the material must be the same. When more than one car is used the lading must always be kept clear from the floors of the cars, whether a carrying

car or an idler. Both cars carrying the load must be considered of the same capacity as the one of lesser capacity. Flat cars must always be used for loading lumber too long for one car, except as specified in Figs. 3 and 8. On single cars, or the extremes of a group of cars, the lading must not extend beyond the end sills.

2. If the lading consists of piles or telegraph poles or other round timber, they must rest on bearing pieces not less than 10 x 10 inches in section and be loaded with the butts and tops alternating, and if the lading occupies two or more cars, each tier must be separated by strips over the bearing pieces and must be well wrapped with wire around the middle and both ends to prevent shifting, and in all cases there must be at least two pairs of stakes at each end of lading, and securely fastened as described in General Instructions, paragraph 7.

3. Where the lading projects so as to necessitate the use of an idler, and there is sufficient material in one consignment, another car may be loaded in reverse order and one idler serve for both cars, and the space between the projecting ends may be utilized to load the idler with short lumber; but in all cases there must be at least two feet between the ends of such loadings. The lading of the idler must not exceed two-thirds its marked capacity.

4. Where the dimensions of bearing pieces are not otherwise specified, they must be not less than 8 x 8 inches in section, and extend the full width of the car. They must never be placed between the bolster and the end of the car, but either between the bolsters or directly above them. When there is but one bearing piece it should not be less than 12 inches from center of bolster.

5. Where maximum weights are not specified in these instructions, the usual excess will be allowed.

6. All stakes must be sound, straight-grained lumber, free from knots (hard wood preferred), and of full size to fit stake pockets. Care must be taken to keep the stakes from spreading at the top while cars are being loaded, and in no case must the load exceed the width of the car.

7. Opposite stakes must always be fastened together. In cases where the lumber is confined to one car and does not project beyond the end the stakes should be secured at the tops, either with wire or boards. In cases where the load projects beyond the end of a car or is carried in two or more cars, the stakes must be secured at the tops with wire, but if the load exceeds 3 feet in height, the stakes must be secured at the middle with wire and at the tops either with wire or boards. The wire used should be equal to six strands or three wrappings of No. 8 telegraph wire, and the stakes must be notched to prevent the wire from slipping. When boards are used there must be two to each pair of stakes 1 x 4 inches in section, securely nailed to each side of the stakes with not less than two 10-penny nails on each side and end. When stakes are wired at the middle there should be a bearing piece across the lading of such size as to keep the material apart sufficiently to protect it from injury by these wires.

8. All cars must be so loaded as to leave not less than 18 inches between ends of lumber and brake shaft, so that brakes will be operative—one brake for one or two cars and two brakes for three or five cars.

MAXIMUM HEIGHT FOR LOADING DIFFERENT KINDS OF LUMBER, BASED ON THE ORDINARY WIDTH OF CARS, BETWEEN STAKES, OF 8 FEET 6 INCHES.

FIG. 1.

Kind of Lumber	WHITE PINE AND POPLAR.				YELLOW PINE, WALNUT AND ASH.				OAK, HICKORY AND ELM.															
	35,000	40,000	50,000	60,000	35,000	40,000	50,000	60,000	35,000	40,000	50,000	60,000												
Weight	Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.													
Length of Lumber16	5	4	6	1	7	8	9	2	4	9	5	5	6	9	8	2	3	7	4	1	5	1	6	1
" "18	4	9	5	5	6	9	8	2	4	3	4	10	6	0	7	3	3	2	3	7	4	6	5	5
" "20	4	3	4	11	6	1	7	4	3	10	4	4	5	5	6	6	2	10	3	3	4	1	4	9
" "22	3	11	4	5	5	7	6	8	3	5	3	11	4	11	5	11	2	7	2	11	3	8	4	5
" "24	3	7	4	1	5	1	6	1	3	2	3	7	4	6	5	5	2	4	2	8	3	5	4	1
" "26	3	3	3	9	4	8	5	8	2	11	3	4	4	2	5	0	2	2	2	6	3	2	3	9
" "28	3	1	3	6	4	4	5	3	2	8	3	1	3	10	4	8	2	0	2	4	2	11	3	6
" "30	2	10	3	3	4	1	4	11	2	6	2	11	3	7	4	4	1	11	2	2	2	8	3	3
" "32	2	8	3	1	3	10	4	7	2	4	2	8	3	5	4	1	1	9	2	0	2	6	3	1

FIG. 2.

Kind of Lumber	WHITE PINE AND POPLAR.				YELLOW PINE, WALNUT AND ASH.				OAK, HICKORY AND ELM.															
	35,000	40,000	50,000	60,000	35,000	40,000	50,000	60,000	35,000	40,000	50,000	60,000												
Weight	Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.													
Length of Lumber16	7	0	8	0	10	0	12	0	6	3	7	1	8	11	10	8	4	8	5	4	6	8	8	0
" "18	6	3	7	1	8	11	10	8	5	6	6	4	7	11	9	6	4	2	4	9	5	11	7	1
" "20	5	7	6	5	8	0	9	7	5	0	5	8	7	1	8	6	3	9	4	3	5	4	6	5
" "22	5	1	5	10	7	3	8	9	4	6	5	2	6	6	7	9	3	5	3	10	4	10	5	10
" "24	4	8	5	4	6	8	8	0	4	2	4	9	5	11	7	1	3	1	3	7	4	5	5	4
" "26	4	4	4	11	6	2	7	5	3	10	4	4	5	6	6	7	2	10	3	3	4	1	4	11
" "28	4	0	4	7	5	8	6	10	3	7	4	1	5	1	6	1	2	8	3	0	3	10	4	7
" "30	3	9	4	3	5	4	6	5	3	4	3	9	4	9	5	8	2	6	2	10	3	7	4	3
" "32	3	6	4	0	5	0	6	0	3	1	3	7	4	5	5	4	2	4	2	8	3	4	4	0
" "34	3	3	3	9	4	8	5	8	2	11	3	4	4	2	5	0	2	2	2	6	3	1	3	9

MAXIMUM HEIGHT FOR LOADING DIFFERENT KINDS OF LUMBER, BASED ON THE ORDINARY WIDTH OF CARS, BETWEEN STAKES, OF 8 FEET 6 INCHES—CONTINUED.

FIG. 4.

Kind of Lumber.....	WHITE PINE AND POPLAR.			YELLOW PINE, WALNUT AND ASH.			OAK, HICKORY AND ELM.			
	Weight	Length of Lumber	Weight	Length of Lumber	Weight	Length of Lumber	Weight	Length of Lumber	Weight	Length of Lumber
Weight	36,000	45,000	55,000	36,000	45,000	55,000	36,000	45,000	55,000	
Length of Lumber, 36 feet	2' 4"	2' 11"	3' 7"	2' 2"	2' 8"	3' 4"	1' 7"	2' 0"	2' 6"	
Weight	34,000	42,000	51,000	34,000	42,000	51,000	34,000	42,000	51,000	
Length of Lumber, 38 feet	2' 2"	2' 8"	3' 4"	1' 11"	2' 5"	2' 11"	1' 5"	1' 9"	2' 2"	
Weight	32,000	39,000	48,000	32,000	39,000	48,000	32,000	39,000	48,000	
Length of Lumber, 40 feet	1' 11"	2' 4"	2' 11"	1' 9"	2' 1"	2' 7"	1' 3"	1' 7"	1' 11"	
Weight	30,000	37,000	45,000	30,000	37,000	45,000	30,000	37,000	45,000	
Length of Lumber, 42 feet	1' 9"	2' 2"	2' 7"	1' 6"	1' 11"	2' 4"	1' 2"	1' 5"	1' 9"	

FIG. 6.

Kind of Lumber.....	WHITE PINE AND POPLAR.			YELLOW PINE, WALNUT AND ASH.			OAK, HICKORY AND ELM.			
	Weight	Length of Lumber	Weight	Length of Lumber	Weight	Length of Lumber	Weight	Length of Lumber	Weight	Length of Lumber
Weight	54,000	66,000	80,000	54,000	66,000	80,000	54,000	66,000	80,000	
	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	
Length of Lumber.....	3 4	4 0	4 11	2 11	3 7	4 4	2 2	2 8	3 3	
" ".....	2 11	3 7	4 4	2 8	3 2	3 10	1 11	2 5	2 11	
" ".....	2 8	3 3	3 11	2 4	2 10	3 6	1 9	2 2	2 7	
" ".....	2 5	2 11	3 7	2 1	2 7	3 2	1 7	1 11	2 4	
" ".....	2 2	2 8	3 3	1 11	2 5	2 11	1 5	1 9	2 1	
" ".....	2 0	2 6	3 0	1 10	2 2	2 8	1 4	1 8	2 0	
" ".....	1 11	2 3	2 9	1 8	2 0	2 6	1 3	1 6	1 10	

FIG. 7.

Kind of Lumber.....	WHITE PINE AND POPLAR.						YELLOW PINE, WALNUT AND ASH.						OAK, HICKORY AND ELM.					
	45,000		56,000		67,500		45,000		56,000		67,500		45,000		56,000		67,500	
Weight.....	Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.	
Length of Lumber.....40	2	9	3	5	4	1	2	5	3	0	3	8	1	10	2	3	2	9
" ".....45	2	5	3	0	3	8	2	2	2	8	3	3	1	7	2	0	2	5
" ".....50	2	2	2	9	3	4	1	11	2	5	2	11	1	5	1	10	2	2
" ".....55	2	0	2	6	3	0	1	9	2	2	2	8	1	4	1	8	2	0
" ".....60	1	10	2	3	2	9	1	7	2	0	2	5	1	3	1	6	1	10
" ".....65	1	8	2	1	2	6	1	6	1	10	2	3	1	1	1	5	1	8
" ".....70	1	7	1	11	2	4	1	5	1	9	2	1	1	0	1	3	1	7

FIG. 8.

Kind of Lumber.....	WHITE PINE AND POPLAR.						YELLOW PINE, WALNUT AND ASH.						OAK, HICKORY AND ELM.					
	40,000		50,000		60,000		40,000		50,000		60,000		40,000		50,000		60,000	
Weight.....	Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.	
Length of Lumber.....70	1	5	1	9	2	1	1	3	1	6	1	10	0	11	1	2	1	5
" ".....80	1	3	1	5	1	10	1	1	1	4	1	7	0	10	1	0	1	3
Weight.....	54,000		66,000		80,000		54,000		66,000		80,000		54,000		66,000		80,000	
Length of Lumber.....90	1	5	1	9	2	2	1	3	1	7	1	11	1	0	1	2	1	5
" ".....100	1	4	1	7	1	11	1	2	1	5	1	8	0	10	1	1	1	3

FIG. 9.

Kind of Lumber.....	WHITE PINE AND POPLAR.						YELLOW PINE, WALNUT AND ASH.						OAK, HICKORY AND ELM.					
	60,000		75,000		90,000		60,000		75,000		90,000		60,000		75,000		90,000	
Weight.....	Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.		Ft. In.	
Length of Lumber.....50	3	6	4	4	5	3	3	1	3	10	4	9	2	3	2	11	3	6
" ".....55	3	2	3	11	4	9	2	10	3	6	4	3	2	1	2	8	3	2
" ".....60	2	11	3	7	4	4	2	7	3	3	3	10	1	11	2	5	2	11
" ".....65	2	8	3	4	4	0	2	4	3	0	3	7	1	9	2	3	2	8

These tables of dimensions and weights are estimates, based on green lumber, and where the heights are exceeded the load should be weighed, as different degrees of seasoning in different lumber will change the weights from ten to twenty-five per cent.

RULES GOVERNING THE LOADING AND CARRYING OF LONG
STRUCTURAL MATERIAL, PLATES, RAILS, GIRDERS, ETC.

GENERAL INSTRUCTIONS.

1. On account of the great variety of form and weight of long structural material, no general rules can be made to suit all cases. The following regulations are, therefore, intended to cover only the most common forms. When material cannot be loaded in accordance with these regulations, special instructions must be asked for.

2. Cars to be used for shipments of this character must be carefully examined before loading, and all defects must be remedied before the cars are loaded. Great care must be taken not to overload cars, and in the case of very long or very heavy material the truss rods should be screwed up tight. The weight of the lading carried on any car must be governed not only by the marked capacity of the car, but also by its general construction, as well as by the number and location of the bearing pieces upon which the load rests. The regulations covering these points are given in Detail Instructions for each form of loading, and must be strictly adhered to. The only exceptions are cars which have been specially prepared for the shipment of particular forms of material.

3. Material over forty feet long carried on two or three cars must always be examined by a competent inspector before the cars are moved from the loading point. If no inspector is stationed at the loading point, the local agent must give notice to the proper authority when the cars are loaded, so that proper inspection can be arranged for. The object of such inspection is to see that these regulations have been complied with.

4. Standing room of at least 18 inches must always be left around brake shaft at one end of the car to permit the proper operation of the brake, and at the other end of the car, when a single car is used, the lading must not project beyond the end sill, except in the following case: When the lading is too long to go inside the car, but will not extend more than 6 inches beyond the end sill, such method of loading will be permitted, providing the projecting ends of the material will clear 6 feet 6 inches above the rail.

5. In all other cases when the lading extends beyond the end sill of the car, an idler must be used or the material must be loaded on two or three cars, as the case may demand, and as explained under Detail Instructions below.

6. Long iron, rails, bridge material, channels, angle irons, etc., should, whenever possible, be loaded on single gondola cars inside the end gates, which must in all cases be raised and securely fastened. Single flat cars must not be used for rails or bar iron, unless furnished with substantial end boards to prevent shifting of the load.

7. Whenever the lading is carried by more than one car, all slack between cars must be removed by the use of spacing blocks in the manner described in Detail Instructions. Cars must also be chained together in order to prevent parting in case of failure of the couplings. When cars are used which are not permanently equipped with safety chains, chains made of not less than three-quarter-inch iron must be passed around the body bolsters and across under sills, forming a loop back of bolster

and doubling to point of coupling between the two cars, and so tie them together. These long chains must only have a sufficient amount of slack to permit the cars to curve. At interchange points chains will either be removed, or the receiving road will furnish the delivering road with chains of the same quality and dimensions as those received.

8. When either one or two bearing pieces are required, they must never be placed between the bolster and the end of the car, but either between the bolsters or directly above the bolsters. When only one bearing piece is used on a car, as in Figs. 13 and 14, it must be placed at a distance of at least 12 inches from center of bolster toward center of car.

9. All spacing blocks between cars, bearing pieces, spacing blocks between material, clamping pieces, bolsters and all braces must be of hard wood and sound in every way. Dimensions given are, however, intended to be general only, and any material that may be suitable for blocking, but which differs in dimensions from figures given, but which is of equal strength or stronger, may be utilized.

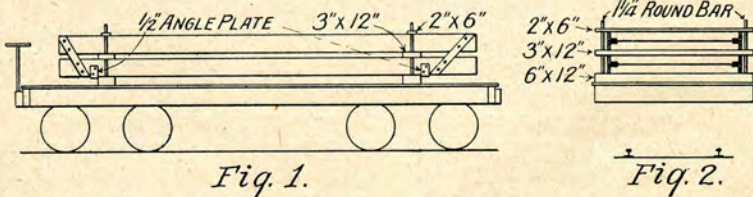
10. Height and width of lading must be governed by tunnel and bridge limits of roads over which lading is destined.

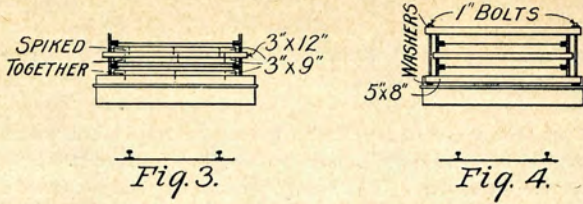
11. When two or three cars are used, cars carrying load must be considered of the same capacity as the one of lesser capacity.

DETAIL INSTRUCTIONS.

LOADING OF SINGLE CARS WITHOUT IDLERS.

12. Large girders loaded on flat side on flat cars must always be carried upon bearing blocks not less than 4 x 12 inches, which must be placed one over each bolster and secured to the floor with two $\frac{7}{8}$ -inch bolts. When two or more large girders are carried on a flat car, the bearing blocks must not be less than 6 x 12 inches, and fastened in the same manner to the floor. In addition, spacing blocks not less than 3 x 12 inches must be placed between each girder. Lateral motion must be prevented by means of upright iron stanchions, driven into holes in the bearing pieces and held together at the top by not less than 2 x 6 inch planks, as shown in Fig. 2, or it may be prevented by fitting planks between flanges of the girders, as shown in Fig. 3. To prevent longitudinal motion, angle plates, 5 or 6 inches wide by $\frac{1}{2}$ inch thick, must be bolted firmly to the lower girders close to the bearing pieces, as shown in Fig. 1, or if rivet holes are not available, it may be prevented by clamps, as shown in Fig. 4. The upper girder must be held to the lower girder by diagonal flat-iron braces bolted to both girders, as shown in Fig. 1. If, however, girders are clamped together, as shown in Fig. 4, the diagonal flat-iron braces need not be applied.



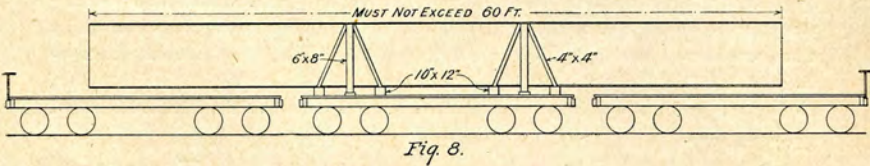
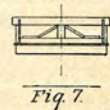
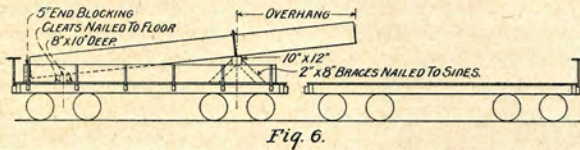
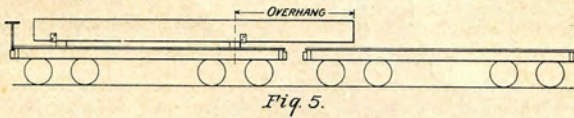


LOADING OF SINGLE CARS WITH IDLERS.

13. When the lading is too long to go inside of a car and extends more than six inches beyond the end sill, such loading will be permitted if an idler or idlers are provided to protect the overhanging part of the loads, as in Figs. 5, 6 and 8; but in these cases the length of the permissible overhang must be governed by the width of the lading and its height above the rail, and it must in no case exceed the figures given below, which are based on clearance required on a twenty-degree curve, it being understood that the load must be placed centrally on the car and the amount of overhang measured from center of bolster on the carrying car.

For loading in accordance with Figs. 5, 6 and 8 :

8 feet wide	10 feet overhang.
7 feet wide	14 feet overhang.
6 feet wide, or less	18 feet overhang.



14. To prevent overloading of the truck under the overhanging end, as shown in Figs. 5 and 6, the carrying capacity of the car will decrease in the following manner as the length of the overhang increases :

- For overhang not exceeding 5 feet, car may carry full marked capacity.
- For overhang not exceeding 10 feet, car may carry three-fourths of the marked capacity.
- For overhang greater than 10 feet, car may carry one-half the marked capacity.

15. (a) The idlers used with loads as shown in Figs. 5 and 8 must be flat cars, unless the width of the overhanging part of the lading is at least three feet less than the width given for each length of overhang in the table in paragraph 13, in which case drop-end gondola cars may be used.

(b) The idler used with loads as shown in Fig. 6 may be a low-side gondola car, but must not be a high-side gondola car.

16. The idlers may be loaded with any suitable material, provided the consignee and the destination of the material on all the cars are the same. There must be, however, a space of at least 2 feet between the loadings on the carrying car and on the idler. The carrying capacity of the idler depends upon how far the overhang extends over the idler, and must not exceed the following figures, except with loadings as in Fig. 6, in which the overhang may be so far above the floor of the idler as not to interfere with its lading. In such cases the idler may carry full marked capacity.

When overhang does not extend over idler more than 5 feet, full marked capacity.

When overhang does not extend over idler more than 10 feet, three-fourths of the marked capacity.

When overhang extends over idler more than 10 feet, one-half of the marked capacity.

17. When large girders are loaded, as shown in Fig. 5, they must be secured to carrying car, as explained in paragraph 12.

18. When material is loaded on gondola cars and is longer than the body of the car, as shown in Fig. 6, one end must rest on a bearing piece not less than 10 x 8 inches, placed on the floor above the bolster and extending the width of the car. It must in all cases be of sufficient depth to prevent the lading at this end from touching the floor of the car. It must be secured from shifting by cleats nailed to the floor. The end boards at this end of the car must be protected by blocking not less than 5 inches thick, fitted snugly between the side boards and extending upward to a height sufficient to prevent all parts of the load from touching the end boards of the car. The other end of the load must rest upon a bearing piece, square or round, preferably square, not less than 8 x 10 inches if square cornered, nor less than 10 inches in diameter if round. This bearing piece must rest upon the side boards of the car directly above the bolster, and it must be securely braced to prevent both lateral and longitudinal motion, and if round it must also be braced against rolling; it must also be supported from bending. Figs. 6 and 7 show substantially how both bearing pieces are to be secured. To prevent the load from shifting in a lateral direction on the bearing piece, iron stanchions tied together with a plank at their upper ends must be used as described in paragraph 12.

19. A method of loading especially adapted to long lattice girders, which may be injured if loaded on more than one car, is shown in Fig. 8. For loads of this character four bearing pieces must be placed in pairs on the carrying car, each pair being placed centrally above the bolster, with a distance apart of not over 5 feet nor less than 3 feet; they must be fastened to the floor with bolts, as explained in paragraph 12, and the upright supports must have side braces. Braces or tie-rods must be secured to the overhanging ends and to the bearing pieces, as shown in Fig. 17. Longitudinal motion must be prevented by the use of plates or clamps, as explained in paragraph 12.

LOADING OF TWO OR THREE CARS WITH OR WITHOUT IDLERS.

20. Material which in length exceeds the limits given for the loading of one car must be loaded on two or three cars, as shown in Figs. 9, 10, 11, 12, 13, 14, 15 and 16. With loads of this character the lading must never exceed maximums given in paragraph 26. The carrying cars must always have all slack between them removed by the use of spacing blocks, as described in detail in paragraph 28, and the cars must be chained together, as explained in the General Instructions, paragraph 7.



Fig. 9.

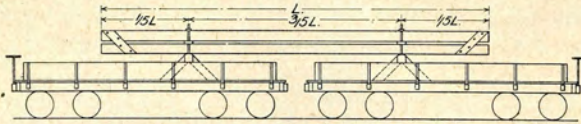


Fig. 10.

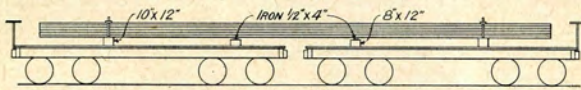


Fig. 11.

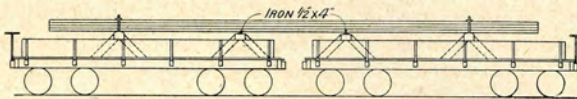


Fig. 12.



Fig. 13.

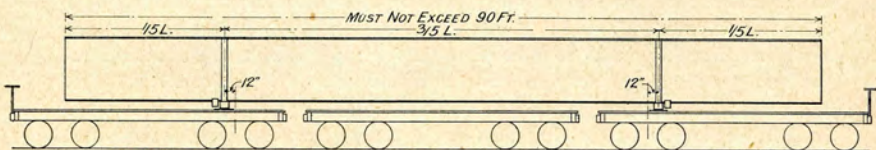


Fig. 14.

21. Material loaded on gondola cars with drop ends or open ends or on flat cars, as shown in Fig. 9, must have one bearing piece not less than ten inches wide by twelve inches deep secured to the floor of each car with two $\frac{3}{8}$ -inch bolts. Lateral and longitudinal motions must be prevented in the manner described in paragraph 12. In the case of gondola cars, a clearance of at least eighteen inches between the load and car sides must always be provided for curving.

22. Material loaded on gondola cars without drop end doors, as shown in Figs. 10 and 12, must have bearing pieces placed on the top of the side boards, of the same size and secured in the same manner as described in paragraph 18. The lading must be secured from lateral and longitudinal motions as described in paragraph 12.

23. Long flexible material, like plates, etc., must be loaded on four bearing pieces, as shown in Figs. 11 and 12. The two center bearing pieces must, however, be two inches lower than the end pieces and have flat iron $\frac{1}{2} \times 4$ inches secured on their upper side, either with spikes having countersunk heads or with two $\frac{1}{2}$ -inch lag-screws at each end; these iron pieces, which are intended to facilitate curving, must extend at least one foot beyond each side of the lading and must be coated with grease. The bearing pieces must be secured to the car, and the material clamped together to prevent it from shifting, in the manner described in paragraphs 12 and 18. If loaded in gondola cars with drop end doors, the same clearance must be provided between lading and car sides as specified in paragraph 21.*

24. Large girders loaded on edge, as shown in Figs. 13, 14, 15 and 16, on two or three cars, either with or without idler, must be supported on two swiveling bolsters, which may be constructed either as a double bolster (Fig. 15) or a single bolster (Fig. 16). The double bolster is preferable for wide and heavy loads on account of the better distribution of the load over the car stringers, and must always be used when the width of the lading exceeds three feet or its weight exceeds one-half the marked capacity of the car. Deep girders which cannot be loaded on double bolsters without exceeding the limit in height in paragraph 13, and low girders less than three feet wide, may be loaded on single bolsters, provided that the weight carried by each car does not exceed one-half of its marked capacity. When double bolsters are used, the lower piece must be securely fastened to the car floor, as described in paragraph 12, and must be not less than 6 inches deep by 18 inches wide. King bolts, center bearings and side bearings must be used for either kind of bolster, and both center bearings and side bearings for the upper bolster must move on corresponding bearings, secured either to the lower bolster or to the floor of the car, as the case may be. When wrought-iron plates are used for side bearings with single bolsters, the lower plate must be fastened to the car floor with countersunk screws or with two lag-screws at each end placed at least 12 inches away from sides of bolsters. The girders must also be secured to the upper bolster with diagonal tie-rods or braces, as shown in Fig. 17; if braces are used, they must be not less than 3 x 8 inches. Diagonal side braces must be used between the top flange of the girder and the outer ends of the top bolster, as shown in Figs. 15 and 16. When the lading consists of two or more girders standing side by side or lying on their sides, they must be securely fastened to each other as described in paragraph 12.

*If more than four bearing pieces are required to properly support the lading, the center pieces on each car must be provided with upright stanchions, as in paragraph 12; all other bearing pieces to have flat iron secured to their upper sides to allow for curving, as provided with four bearing pieces.

WHEN LOADING LATTICE GIRDERS, OR IF IT IS CONVENIENT TO REMOVE RIVETS, A ROD NOT LESS THAN $\frac{3}{4}$ " DIA. MAY BE USED TO TIE BRACES TOGETHER, AS SHOWN IN DOTTED LINES.

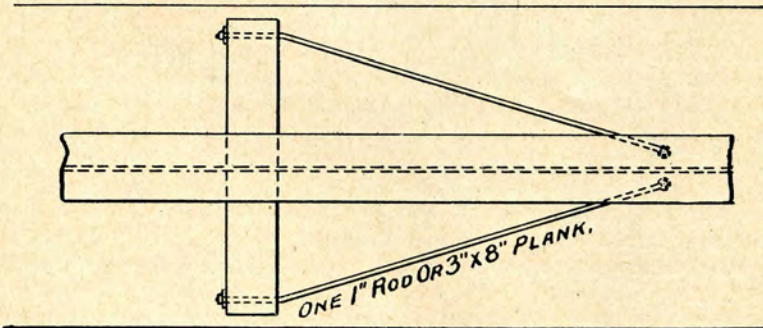
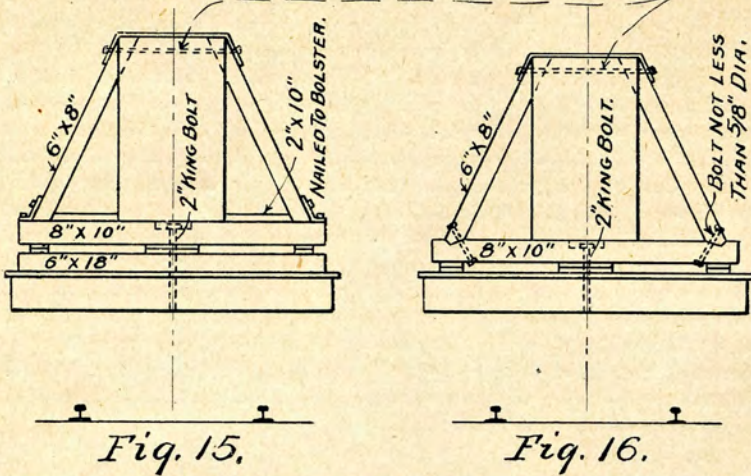


Fig. 17.

25. The location of the bolsters depends upon the length and the width of the girders, as well as upon their stability, and they should, if possible, be so placed that the length of each overhanging end is not more than one-fifth, and the distance between the bolsters not less than three-fifths, of the total length of the girder. The following table gives locations of bolsters for girders of maximum length and width, based on clearance required on a twenty-degree curve:

- 60 feet long by 8 feet wide or less, bolsters not less than 36 feet between centers.
- 70 feet long by $7\frac{1}{4}$ feet wide or less, bolsters not less than 42 feet between centers.
- 80 feet long by $6\frac{1}{2}$ feet wide or less, bolsters not less than 48 feet between centers.
- 90 feet long by $5\frac{1}{2}$ feet wide or less, bolsters not less than 54 feet between centers.

In cases of material of less width than $5\frac{1}{2}$ feet bu. of greater length than 90 feet, application must be made to the proper authority for special instructions.

26. To prevent overloading the following regulations must be adhered to :

a. When only one bearing piece is used and its location is near the center of the car, as in Fig. 9. Flat cars having only two truss rods, weight of lading must not exceed one-half of marked capacity of car. Flat cars having more than two truss rods, also low-side gondola cars, weight of lading must not exceed two-thirds of the marked capacity of car.

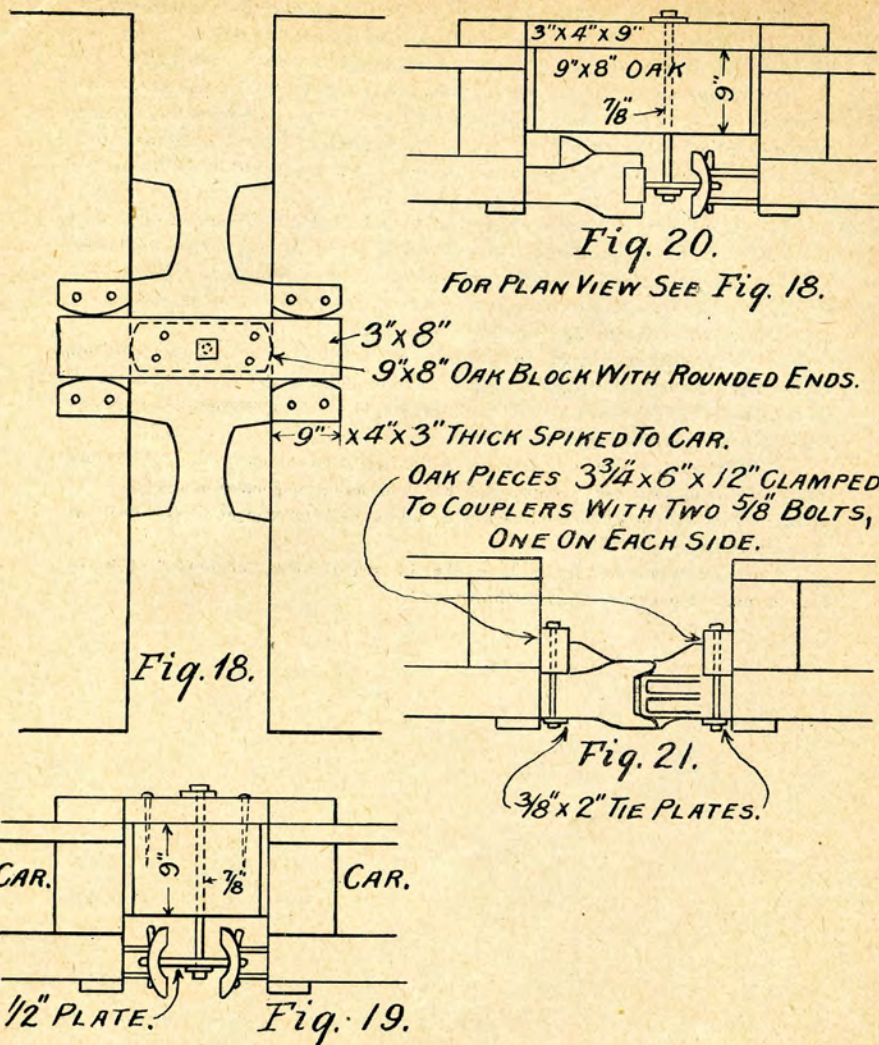
b. When only one bearing piece is used and it is located about equal distance from center of car and center of truck, as on end car in Fig. 13. Flat cars having only two truss rods, weight of lading must not exceed two-thirds of marked capacity of car. Flat cars having more than two truss rods, also low-side gondola cars, weight of lading must not exceed three-fourths of marked capacity of car.

c. When only one bearing piece is used, and it is located at or near the center of the truck, as on center car in Fig. 13, and on end cars in Fig. 14, or on top of sides on high-side gondola cars in Fig. 10, the weight of the lading must not exceed one-half of the marked capacity of the car.

d. When more than one bearing piece is used on each car, as in Figs. 11 and 12. Flat cars and low-side gondola cars, weight of lading may equal marked capacity of car. High-side gondola cars, weight of lading must not exceed three-fourths of the marked capacity of car.

27. The selection of cars to be used as idlers with loads, as shown in Figs. 13 and 14, must be governed by paragraph 15 (*a*).

BLOCKING CARS APART.



28. The method of blocking cars apart, to be used when a load is carried on two adjacent cars, or when it is carried on two cars separated by an idler, is shown in Figs. 18 to 21, inclusive. Figs. 18 and 19 represent both the cars with ordinary drawheads. Fig. 20 represents one car with M. C. B. coupler and the other car with ordinary drawhead. Fig. 21 represents both cars with M. C. B. couplers. In blocking cars apart they must first be separated by means of jacks until all the slack in the springs, couplers or links, if the latter are used, has been taken up; the spacing blocks must then be neatly fitted between the cars and secured in the manner shown. All wood used must be sound oak.

