

# MEMORANDUM

DEPARTMENT OF TRANSPORTATION  
Staff Bridge Branch  
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**DATE:** February 22, 2008

**TO:** CDOT Bridge Rating and Overloads Squad  
Johnny W. Olson, Maintenance & Operations Branch Manager  
Teresa Lawser, Vehicle Permit Office Manager

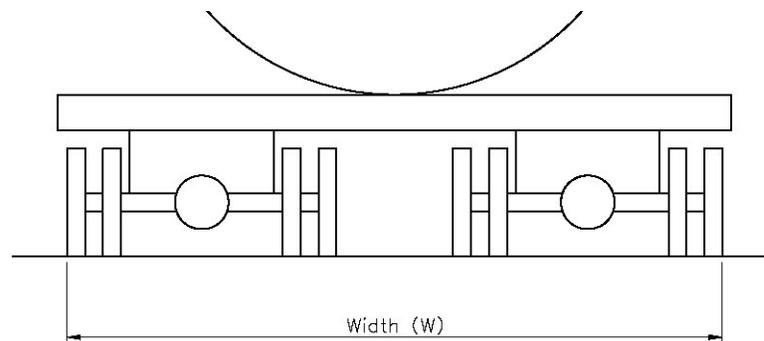
***Signature on file***

**FROM:** Mark A. Leonard, Staff Bridge Branch Manager

**SUBJECT:** Policy for Evaluating the Colorado Bridge Weight Limit Map for Over-wide Overweight Vehicles

The allowable loads on the Colorado Bridge Weight Limit Map apply to vehicles of standard width. The attached table is provided to show the allowable loads for vehicles that are extra wide. The purpose of the table is to allow permit writers and trucking companies to readily evaluate the Colorado Bridge Weight Limit Map for over-wide vehicles.

The following information documents the application of the AASHTO specifications for evaluating the Colorado Bridge Weight Limit Map for Double Dolly vehicles (see Figure 1). CDOT's previous practice was to provide an allowance for width only when vehicles were 12' to 24' wide. With the following this is changed to 10' to 20' for closer conformity to the AASHTO Standard Specifications. The AASHTO specifications are based on a standard truck assumed to occupy a width of 10' (Article 3.6.1). Staff Bridge is in the process of incorporating this information in the CDOT Bridge Rating Manual.



Double Dolly – Two (2) independent axles adjacent to one another creating an axle line. Each axle line consists of eight (8) tires.

**Figure 1**

- For axle line widths (W) of 10' and less use the Colorado Bridge Weight Limit Map.
- For axle line widths (W) of 20' and greater use the following equation:

$$A_2 = 2 (A_1) (DF_1 / DF_2)$$

where,

$A_1$  = Maximum Allowable Permit Weight per Axle Group per Colorado Bridge Weight Limit Map.

$A_2$  = Maximum Allowable Permit Weight per Axle Group for a Double Dolly vehicle with a width of 20' or greater.

$DF_1$  = Single Lane Loaded Distribution Factor per AASHTO Standard Specifications, 17th Edition, Section 3.23.

$DF_2$  = Multi-Lane Loaded Distribution Factor per AASHTO Standard Specifications, 17th Edition, Section 3.23.

- For axle line widths (W) between 10' and 20' use the following to determine the Maximum Allowable Permit Weight per Axle Group:

$$A = A_1 + ((W - 10) / 10) ((2 (A_1) (DF_1 / DF_2)) - A_1)$$

where,

A = Maximum Allowable Permit Weight per Axle Group for a given Double Dolly axle line width (W).

W = Double Dolly width.

$DF_1$  and  $DF_2$  are dependent on the bridge type; therefore, the ratio of  $DF_1 / DF_2$  for a concrete deck on Steel I-beams or on Prestressed concrete girders controls in determining the Maximum Allowable Permit Weight per Axle Group for Double Dolly's for most routes. See the following table for common Bridge Types and their associated  $DF_1 / DF_2$  ratios:

Bridge Type	$DF_1$	$DF_2$	$DF_1 / DF_2$
Concrete Deck on Steel I-beams or Prestressed Concrete Girders	S / 7	S / 5.5	0.786
Steel Plank Deck (TTM)	S / 5.5	S / 4.5	0.818
≥ 4 inch Steel Grid Deck	S / 6	S / 5	0.833
≥ 6 inch Nail Laminated Timber Deck on Timber Stringers	S / 5	S / 4.25	0.850
Concrete Deck on Concrete T-Beams	S / 6.5	S / 6	0.923

If there are no concrete deck on Steel I-beams or on Prestressed concrete girders bridges on the route, slightly higher allowable permit weights may be permissible. Contact CDOT Staff Bridge Rating and Overloads Squad for assistance.

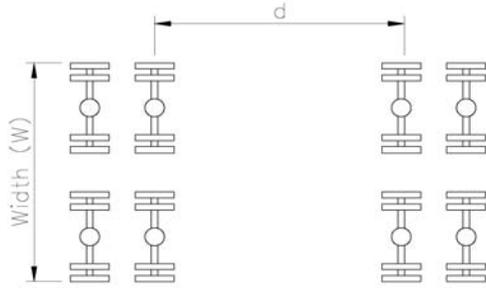
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Attachment

Cc: Pam Hutton, Chief Engineer  
 Delbreath D. Walker, Director of Staff Services  
 Mark Nord, Bridge Asset Management Unit

# COLORADO WEIGHT LIMIT MAP DOUBLE DOLLY MAXIMUM ALLOWABLE PERMIT WEIGHT PER AXLE GROUPS (X 1,000 POUNDS)

Based on AASHTO Standard Specifications live load distribution factors for a concrete deck on Steel I-beams or on Prestressed concrete girders



Double Dolly = Two axles adjacent to one another. Each axle line consists of eight (8) tires. A Double Dolly is typically used for very large and heavy loads such as Electrical Transformers or Refinery Equipment.

d = The distance between axle groups as defined on the Colorado Weight Limit Map.

W	Axle Groups	Distance (d) Between Axle Groups								
		8' < d < 10'			10' ≤ d < 12'			d ≥ 12'		
		Orange	Yellow	White	Orange	Yellow	White	Orange	Yellow	White
≤ 10' - 0"	Single Axle	22.0	25.0	27.0	22.0	25.0	27.0	22.0	25.0	27.0
	Tandem Axle	36.0	39.0	43.0	39.0	43.0	47.0	42.0	46.0	50.0
	Triple Axle	49.0	53.0	58.0	53.0	58.0	63.0	55.0	60.0	65.0
	Four or more Axles	52.0	57.0	62.0	57.0	62.0	68.0	60.0	66.0	72.0
11' - 0"	Single Axle	23.3	26.4	28.5	23.3	26.4	28.5	23.3	26.4	28.5
	Tandem Axle	38.1	41.2	45.5	41.2	45.5	49.7	44.4	48.6	52.9
	Triple Axle	51.8	56.0	61.3	56.0	61.3	66.6	58.1	63.4	68.7
	Four or more Axles	55.0	60.3	65.5	60.3	65.5	71.9	63.4	69.8	76.1
12' - 0"	Single Axle	24.5	27.9	30.1	24.5	27.9	30.1	24.5	27.9	30.1
	Tandem Axle	40.1	43.5	47.9	43.5	47.9	52.4	46.8	51.3	55.7
	Triple Axle	54.6	59.1	64.6	59.1	64.6	70.2	61.3	66.9	72.4
	Four or more Axles	57.9	63.5	69.1	63.5	69.1	75.8	66.9	73.5	80.2
13' - 0"	Single Axle	25.8	29.3	31.6	25.8	29.3	31.6	25.8	29.3	31.6
	Tandem Axle	42.2	45.7	50.4	45.7	50.4	55.1	49.2	53.9	58.6
	Triple Axle	57.4	62.1	67.9	62.1	67.9	73.8	64.4	70.3	76.1
	Four or more Axles	60.9	66.8	72.6	66.8	72.6	79.7	70.3	77.3	84.3
14' - 0"	Single Axle	27.0	30.7	33.2	27.0	30.7	33.2	27.0	30.7	33.2
	Tandem Axle	44.2	47.9	52.8	47.9	52.8	57.8	51.6	56.5	61.4
	Triple Axle	60.2	65.1	71.2	65.1	71.2	77.4	67.6	73.7	79.8
	Four or more Axles	63.9	70.0	76.2	70.0	76.2	83.6	73.7	81.1	88.4
15' - 0"	Single Axle	28.3	32.2	34.7	28.3	32.2	34.7	28.3	32.2	34.7
	Tandem Axle	46.3	50.2	55.3	50.2	55.3	60.5	54.0	59.2	64.3
	Triple Axle	63.0	68.2	74.6	68.2	74.6	81.0	70.7	77.2	83.6
	Four or more Axles	66.9	73.3	79.7	73.3	79.7	87.5	77.2	84.9	92.6
16' - 0"	Single Axle	29.6	33.6	36.2	29.6	33.6	36.2	29.6	33.6	36.2
	Tandem Axle	48.4	52.4	57.8	52.4	57.8	63.1	56.4	61.8	67.2
	Triple Axle	65.8	71.2	77.9	71.2	77.9	84.6	73.8	80.6	87.3
	Four or more Axles	69.8	76.6	83.2	76.6	83.2	91.3	80.6	88.6	96.7
17' - 0"	Single Axle	30.8	35.0	37.8	30.8	35.0	37.8	30.8	35.0	37.8
	Tandem Axle	50.4	54.6	60.2	54.6	60.2	65.8	58.8	64.4	70.0
	Triple Axle	68.6	74.2	81.2	74.2	81.2	88.2	77.0	84.0	91.0
	Four or more Axles	72.8	79.8	86.8	79.8	86.8	95.2	84.0	92.4	100.8
18' - 0"	Single Axle	32.1	36.4	39.3	32.1	36.4	39.3	32.1	36.4	39.3
	Tandem Axle	52.5	56.8	62.7	56.8	62.7	68.5	61.2	67.0	72.9
	Triple Axle	71.4	77.2	84.5	77.2	84.5	91.8	80.1	87.4	94.7
	Four or more Axles	75.8	83.1	90.3	83.1	90.3	99.1	87.4	96.2	104.9
19' - 0"	Single Axle	33.3	37.9	40.9	33.3	37.9	40.9	33.3	37.9	40.9
	Tandem Axle	54.5	59.1	65.1	59.1	65.1	71.2	63.6	69.7	75.7
	Triple Axle	74.2	80.3	87.8	80.3	87.8	95.4	83.3	90.9	98.4
	Four or more Axles	78.7	86.3	93.9	86.3	93.9	103.0	90.9	99.9	109.0
≥ 20' - 0"	Single Axle	34.6	39.3	42.4	34.6	39.3	42.4	34.6	39.3	42.4
	Tandem Axle	56.6	61.3	67.6	61.3	67.6	73.9	66.0	72.3	78.6
	Triple Axle	77.0	83.3	91.1	83.3	91.1	99.0	86.4	94.3	102.1
	Four or more Axles	81.7	89.6	97.4	89.6	97.4	106.9	94.3	103.7	113.1