FED. BRIDGE IN USE

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City of Surprise
**Recap of Rules**

**Gross Weight;** the weight of a vehicle or vehicle combination and any load thereon. The Federal gross weight limit on the Interstate System is 80,000 pounds unless the Bridge formula dictates a lower weight.

**Single Axle Weight;** the total weight on one or more axles whose centers are spaced not more than 40 inches apart. The Federal single-axle weight limit on the Interstate System is 20,000 pounds.

**Tandem Axle Weights;** the total weight on two or more axles consecutive axles whose centers are spaced more than 40 inches apart but less than 96 inches apart. The Federal tandem weight limit on the Interstate System is 34,000 pounds.
When measuring the distances on Tandem groups—often referred to the “Rear Group” — there is something to keep in mind. This area of measurement can not be rounded up at the half foot mark like the Outer Bridge measurement; refer to pages marked 2 & 3.

**Tandem Axle Weights:** the total weight on two or more axles consecutive axles whose centers are spaced more than 40 inches apart but less than 96 inches apart. The Federal tandem weight limit on the Interstate System is 34,000 pounds.

On page 6 of the handout; Tandem axles that are more than 8 foot but less than 9 foot are rated at 42,000 pounds. This distance can not be rounded. To be considered for a group rating of 42,500 the distance must be 108” or 9’.
W = 500(LN/N-1 + 12N + 36)

Example

W = 500 ((20 x 3) / (3 – 1) + 12 x 3 +36)
W = 500 (60 / 2 + 36 +36)
W = 500 (30+36+36)
W = 500 (102)
W = 51,000

Is there an easy method????
You can refer to the website listed below
https://ops.fhwa.dot.gov/freight/sw/brdgcalc/calc_page.htm

Your can also refer to page 6 of the Bridge Formula Weights (Revised May 2015) handout that you received today.

On the left side is the length in feet, across the top is the number of axles.

The length is the distance from the center of the front axle to the center of the last axle.

Once you know the length then move across right to the corresponding axle count, this equals the Gross allowable weight of the vehicle.

- Rule of thumb; after the 9 foot distance, you can round to the next level of weight when the distance is 6 inch or more. Example; 19’ 6” can be considered 20’.
Don’t Forget These Items

I. Maximum Gross = 80,0000lbs

II. Front Axle Max = 20,000lbs
   I. More that 10 feet between 1st and 2nd axles
   II. Or less than 40 inches apart

III. Tandem Axle Weight = 34,000lbs
   I. More that 40 inches, but less than 96

IV. Rear Tandem when adding a third axle or Tag
   I. More than 8 ft., but less than 9 ft. = 42,000
   II. 9 ft. or more, but less than 10 ft. = 42,500

V. Verify Tire ratings and air pressure for that rating to match or exceed the projected loads
That was Easy (Now you are Pro’s)

How many of you fully understand the last few slides??????
Let me complicate things a bit; Or not.
Payload = Gross minus Tare; example Gross of 56,160 – Tare of 35,630 = Payload of approx. 20,530 / 2000 = 10.265 tons based on a Bridge of 57,500

Where does this actually end up??

Another example;
On a outer bridge at 51,000, subtract rear tandem of 34,000, this is 17,000.
17,000 is what the allowable on the front axle will be when fully loaded. Then subtract actual empty weights from bridge numbers, (17,000) and (34,000) then divide them by 2000 to get the tonnage, then subtract the front from the rear. This will be the approximate payload possible on the rear axle group. Confusion?? It ‘s simpler than it sounds.
Projected Payloads

Gross of 51,000
17,000 – 16,600 = 400 / 2000 = .2
34,000 – 15,600 = 18,400/ 2000 = 9.2 - .2 = @ 9.0 Tons on rear.

Gross of 50,000
16,000 – 17,500 = -1,500 / 2000 = .75
34,000 – 16,710 = 17,290 / 2000 = 8.645 - .75 = @ 7.895 or 7.9 T Tons on rear.

Gross of 57,500 with Tag, a little more tricky; need to know accurate Tag pressure.
15,500 – 17,520 = -2,020 / 2000 = 1.01 Tag @ 73 empty 64 full
42,000 – 18,110 = 23,890 / 2000 = 11.945 – 1.01 = 10.935

Tag dropped to 70 empty and 67 full
15,500 – 16,490 = -990 / 2000 = .495
42,000 – 18,870 = 23,130 / 2000 = 11.564 - .495 = 11.07

Let me show you how this all works out with all the figures.
Outer Bridge 3 Axle
32 YD Tip-To-Dump
Typical Tandem
I. Wheel Base = 210” or 17’ 6”
II. First to Second Axle = 183” or 15’ 3”
III. First to Last Axle = 236” or 19’ 9”
IV. Gross (Outer Bridge) = 51,000lbs (see Fed. Bridge chart)
V. Tandem Group = 55” of 4’ 7”
VI. Tandem Group Allowable Weight = 34,000lbs
VII. Front Empty = 16,600lbs
VIII. Rear Empty =
   I. Axle #2 = 7,900lbs
   II. Axle #3 = 7,700lbs
   III. Total = 15,600lbs
IX. Tare Weight = 32,250lbs
X. Projected Payload = 51,000 – 32,250 = 18,750 \ 2,000 =
XI. Tons = 9.375
Outer Bridge 3 Axle
27 YD Tip-To-Dump
I. Wheel Base = 198” or 16.5’

II. First to Second Axle = 171” or 14’ 3”

III. First to Last Axle = 225.5” or 18’ 9.5”

IV. Gross (Outer Bridge) = 50,000lbs (see Fed. Bridge chart)

V. Tandem Group = 55” of 4’ 7”

VI. Tandem Group Allowable Weight = 34,000lbs

VII. Front Empty = 17,500lbs

VIII. Rear Empty =
   I. Axle #2 = 8,460lbs
   II. Axle #3 = 8,250lbs
   III. Total = 16,710lbs

IX. Tare Weight = 34,210lbs

X. Projected Payload = 50,000 – 34, 210 = 15,790 \ 2,000 =

XI. Tons = 7.895
Wheel Base = 198” or 16.5’
First to Second Axle = 171” or 14’ 3”
First to Last Axle = 225.5” or 18’ 9.5”
Gross (Outer Bridge) = 50,000lbs (see Fed. Bridge chart)
Tandem Group = 55” of 4’ 7”
Tandem Group Allowable Weight = 34,000lbs
Front Full = 16,530lbs + 530 (Allowable 16,000)
Rear Full =
   I. Axle #2 = 17,700lbs +700 (Allowable 17,000)
   II. Axle #3 = 17,670lbs + 670 (Allowable 17,000)
   III. Total = 35,370lbs +1,370 (Allowable 34,000)
Tare Weight = 34,210lbs
Actual Payload = 51,900 – 34,210 = 17,690 \ 2,000 =
Tons = 8.845 – 1,900 or .95 max payload = 7.895 or 7.9
Outer Bridge 3 Axle
31 YD Tip-To-Dump
Typical Tandem
Outer Bridge 3 Axle 31 YD Tip-To-Dump Empty

I. Wheel Base = 222” or 18’ 6”
II. First to Second Axle = 171” or 16’ 3”
III. First to Last Axle = 250” or 20’ 10”
IV. Gross (Outer Bridge) = 51,500lbs (see Fed. Bridge chart)
V. Tandem Group = 55” of 4’ 7”
VI. Tandem Group Allowable Weight = 34,000lbs
VII. Front Empty = 16,980lbs
VIII. Rear Empty =
   I. Axle #2 = 7,780lbs
   II. Axle #3 = 8,000lbs
   III. Total = 15,780lbs
IX. Tare Weight = 32,760lbs
X. Projected Payload = 51,500 – 32,760 = 18,740 \ 2,000 =
XI. Tons = 9.37
I. Wheel Base = 222” or 18’ 6”
II. First to Second Axle = 171” or 16’ 3”
III. First to Last Axle = 250” or 20’ 10”
IV. Gross (Outer Bridge) = 51,500lbs (see Fed. Bridge chart)
V. Tandem Group = 55” of 4’ 7”
VI. Tandem Group Allowable Weight = 34,000lbs
VII. Front Full = 16,950lbs = -550 (Allowable 17,500)
VIII. Rear Full =
   I. Axle #2 = 17,240lbs = +240 (Allowable 17,000)
   II. Axle #3 = 16,720lbs = -280 (Allowable 17,000)
   III. Total = 33,960lbs = -40 (Allowable 34,000)
IX. Tare Weight = 32,760lbs
X. Actual Payload = 50,910 – 32,760 = 18,150 \ 2,000 =
XI. Tons = 9.075 or 9.1 = -590 of Gross and -40 of Tandem
Outer Bridge 4 Axle
30 YD Tip-To-Dump
Rear Axle Group W/Tag
Outer Bridge 4 Axle
30 YD Tip-To-Dump Empty

I. Wheel Base = 193” or 16’ 1”
II. First to Second Axle = 166” or 13’ 10”
III. First to Last Axle = 271” or 22’ 7”
IV. Gross (Outer Bridge) = 57,500lbs (see Fed. Bridge chart)
V. Tandem Group = 55” or 4’ 7”
VI. Rear Group w/Tag = 105” or 8’ 9”
VII. Tandem Group Allowable Weight = 34,000lbs
VIII. Rear Group w/Tag = 42,000 not 42,500 (see Fed. Bridge chart)
IX. Front Empty = 17,520lbs
X. Rear Empty =
   I. Axle #2 = 5,910lbs
   II. Axle #3 = 5,370lbs
   III. Tag @ 64 psi = 6,830
   IV. Total = 18,110lbs
XI. Tare Weight = 35,630lbs
XII. Projected Payload = 57,500 – 35,630= 21,870 \ 2,000 =
XIII. Tons = 10.935
# Outer Bridge 4 Axle
## 30 YD Tip-To-Dump Full

<table>
<thead>
<tr>
<th>I.</th>
<th>Wheel Base = 193” or 16’ 1”</th>
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<tbody>
<tr>
<td>II.</td>
<td>First to Second Axle = 166” or 13’ 10”</td>
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<tr>
<td>III.</td>
<td>First to Last Axle = 271” or 22’ 7”</td>
</tr>
<tr>
<td>IV.</td>
<td>Gross (Outer Bridge) = 57,500lbs (see Fed. Bridge chart)</td>
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<tr>
<td>V.</td>
<td>Tandem Group = 55” or 4’ 7”</td>
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<tr>
<td>VI.</td>
<td>Rear Group w/Tag = 105” or 8’ 9”</td>
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<tr>
<td>VII.</td>
<td>Tandem Group Allowable Weight = 34,000lbs</td>
</tr>
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<td>VIII.</td>
<td>Rear Group w/Tag = 42,000 not 42,500 (see Fed. Bridge chart)</td>
</tr>
<tr>
<td>IX.</td>
<td>Front Full = 14,340lbs = -1,160 (Allowable 15,500)</td>
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<tr>
<td>X.</td>
<td>Rear Full =</td>
</tr>
<tr>
<td></td>
<td>I. Axle #2 = 17,210lbs = +210 (Allowable 17,000)</td>
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<tr>
<td></td>
<td>II. Axle #3 = 16,820lbs = -180 (Allowable 17,000)</td>
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<tr>
<td></td>
<td>III. Tag @ 56 psi = 7,790 = -210 (Allowable 8,000)</td>
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<tr>
<td></td>
<td>IV. Total = 41,820lbs = -180 (Allowable 42,000)</td>
</tr>
<tr>
<td>XI.</td>
<td>Tare Weight = 35,630lbs</td>
</tr>
<tr>
<td>XII.</td>
<td>Actual Payload = 56,160 – 35,630= 20,530 \ 2,000 =</td>
</tr>
<tr>
<td>XIII.</td>
<td>Tons = 10.265</td>
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</tbody>
</table>
Outer Bridge 4 Axle
30 YD Tip-To-Dump Empty (7564)

I. Wheel Base = 193” or 16’ 1”
II. First to Second Axle = 166” or 13’ 10”
III. First to Last Axle = 271” or 22’ 7”
IV. Gross (Outer Bridge) = 57,500lbs (see Fed. Bridge chart)
V. Tandem Group = 55” or 4’ 7”
VI. Rear Group w/Tag = 105” or 8’ 9”
VII. Tandem Group Allowable Weight = 34,000lbs
VIII. Rear Group w/Tag = 42,000 not 42,500 (see Fed. Bridge chart)
IX. Front Empty = 17,640lbs
X. Rear Empty =
   I. Axle #2 = 6,080lbs
   II. Axle #3 = 5,570lbs
   III. Tag @ 64 psi = 6,550
   IV. Total = 18,200lbs
XI. Tare Weight = 35,840lbs
XII. Projected Payload = 57,500 – 35,840 = 21,660 \ 2,000 =
XIII. Tons = 10.83
I. Wheel Base = 193” or 16’ 1”
II. First to Second Axle = 166” or 13’ 10”
III. First to Last Axle = 271” or 22’ 7”
IV. Gross (Outer Bridge) = 57,500lbs (see Fed. Bridge chart)
V. Tandem Group = 55” or 4’ 7”
VI. Rear Group w/Tag = 105” or 8’ 9”
VII. Tandem Group Allowable Weight = 34,000lbs
VIII. Rear Group w/Tag = 42,000 not 42,500 (see Fed. Bridge chart)
IX. Front Full = 15,270lbs = -230 (Allowable 15,500)
X. Rear Full =
   I. Axle #2 = 17,060lbs = +60 (Allowable 17,000)
   II. Axle #3 = 16,330lbs = -670 (Allowable 17,000)
   III. Tag @ 56 psi = 8,710 = +210 (Allowable 8,000)
   IV. Total = 42,100lbs = +100 (Allowable 42,000)
XI. Tare Weight = 35,840lbs
XII. Actual Payload = 57,370 - 35,840 = 22,010 \ 2,000 =
XIII. Tons = 11.005
Rear Axle Group W/Tag
Outer Bridge 4 Axle
32 YD Full-Eject Empty

I. Wheel Base = 193” or 16’ 1”
II. First to Second Axle = 166” or 13’ 10”
III. First to Last Axle = 271” or 22’ 7”
IV. Gross (Outer Bridge) = 57,500lbs (see Fed. Bridge chart)
V. Tandem Group = 55” or 4’ 7”
VI. Rear Group w/Tag = 105” or 8’ 9”
VII. Tandem Group Allowable Weight = 34,000lbs
VIII. Rear Group w/Tag = 42,000 not 42,500 (see Fed. Bridge chart)
IX. Front Empty = 17,010lbs
X. Rear Empty =
   I. Axle #2 = 6,630lbs
   II. Axle #3 = 6,230lbs
   III. Tag @ 68 psi = 6,830
   IV. Total = 19,690lbs
XI. Tare Weight = 35,630lbs
XII. Projected Payload = 57,500 – 36,700= 20,800 \ 2,000 =
XIII. Tons = 10.4
## Outer Bridge 4 Axle 32 YD Full-Eject Full

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<thead>
<tr>
<th>Item</th>
<th>Specification</th>
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<tr>
<td>I.</td>
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<td>III.</td>
<td>First to Last Axle = 271” or 22’ 7”</td>
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<tr>
<td>IV.</td>
<td>Gross (Outer Bridge) = 57,500lbs (see Fed. Bridge chart)</td>
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<tr>
<td>V.</td>
<td>Tandem Group = 55” or 4’ 7”</td>
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<tr>
<td>VI.</td>
<td>Rear Group w/Tag = 105” or 8’ 9”</td>
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<tr>
<td>VII.</td>
<td>Tandem Group Allowable Weight = 34,000lbs</td>
</tr>
<tr>
<td>VIII.</td>
<td>Rear Group w/Tag = 42,000 not 42,500 (see Fed. Bridge chart)</td>
</tr>
<tr>
<td>IX.</td>
<td>Front Full = 13,780lbs = -1,720 (Allowable 15,500)</td>
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<tr>
<td>X.</td>
<td>Rear Full =</td>
</tr>
<tr>
<td>I.</td>
<td>Axle #2 = 17,080lbs = +80 (Allowable 17,000)</td>
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<tr>
<td>II.</td>
<td>Axle #3 = 16,330lbs = -670 (Allowable 17,000)</td>
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<tr>
<td>III.</td>
<td>Tag @ 75 psi = 9,590 = +1,590 (Allowable 8,000)</td>
</tr>
<tr>
<td>IV.</td>
<td>Total = 43,000lbs = +1,000 (Allowable 42,000)</td>
</tr>
<tr>
<td>XI.</td>
<td>Tare Weight = 36,700lbs</td>
</tr>
<tr>
<td>XII.</td>
<td>Actual Payload = 56,780 – 36,700 = 20,080 \ 2,000 =</td>
</tr>
<tr>
<td>XIII.</td>
<td>Tons = 10.04 – 1,000 = .5 or 9.54</td>
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