SD98-08-F

SD Department of Transportation
Office of Research

Truck Weights and the Bridge Formula

Study SD98-08
Final Report

Prepared by
EnGraph
4840 W. 15th Street, Suite 1016
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September 1999

Task 4 Perform a structural analysis on a representative sample of bridges and non-standard truck configurations identified in Task Three, for strength capacity and fatigue (serviceability). Bridges to be samples will come from South Dakota's bridge inventory.

4.1 Structural Analysis Approach

When evaluating the strength of bridges, one can use three different values to describe the structural capacity of the bridge. The first value is the design load. This was the load used to design a bridge. It may be a truck configuration and magnitude such as "HS20" or "HS25". After it is built, bridge engineers load rate the bridge at two different levels. In each case, a rating vehicle is used with a predefined axle configuration. The "inventory" rating is defined as the allowable gross weight of the rating vehicle that the rating vehicle can use the bridge without experiencing a reduction in bridge life due to use. At the "operating" rating, the gross weight of the rating vehicle is increased so the bridge is still considered "safe", but if the bridge sees heavy truck traffic, the expected bridge life could be reduced due to use.

Originally, many bridge owners began posting bridges based on the inventory rating. However, the more traditional approach now is to post at the operating rating or somewhere between the inventory and operating rating. Throughout this study, the bridge capacity was based on the bridge operating rating.

As discussed earlier, the following information was extracted from the BARS database: number of spans, length of each span, continuity between spans, rating vehicle, operating rating value. Other data was retrieved to satisfy the requirements of PBRaT such as deck type, material, etc but was not considered in the analysis.

After finalizing the bridge and truck databases, the actual gross vehicle weight each truck could carry on each individual bridge was calculated. The approach used to accomplish this task for a single bridge follows: A structural analysis was performed on the bridge to calculate the moment influence lines at critical moment points. The original rating truck was moved in both directions across the bridge at increments equal to one tenth of the span length. The weight of the rating truck equaled the previously calculated operating rating capacity from the BARS database. The maximum positive and negative moments at critical points were stored. An allowable moment capacity envelope for the bridge at critical locations was calculated.

With the moment capacity envelope for the bridge known, the non-standard truck was also moved incrementally across the bridge at its allowable weight prescribed by the Bridge Gross Weight Formula. The moment envelope created by this loading was calculated and compared to the moment capacity envelope. A ratio of the two moment envelopes was used to determine the magnitude of overload or underload created by the non-standard truck. The allowable gross vehicle weight that the non-standard truck could carry, based on the operating rating, was calculated. This was done for all truck/bridge combinations in the database.

With the databases of 201 trucks and 1,178 bridges, there were 236,778 truck/bridge combinations considered in the study. To perform these calculations, a custom software package, PBRaT^2, was used. The software calculates the allowable gross vehicle weights for each truck/bridge combination using the method described above.

Before performing the analysis, the program sorted through the bridge data looking for possible erroneous data that could skew the results. Examples of bad data include invalid structure types, material types, and the sum of the span lengths not equal to the total bridge length. After the invalid data was fixed, the influence lines for each bridge were calculated and stored in a data file. Next, the rating trucks were moved across the bridge to find the moment capacity envelope for each bridge. Finally, each non-standard truck was moved across the bridge, and the allowable gross vehicle weights (based on the bridge operating ratings) were calculated and written to a data file.

Because of this approach, other bridge properties such as dead and impact loads do not need to be considered in this analysis since they were already considered when calculating the original operating rating for the standard rating vehicle.

4.2 Structural Analysis Results

With the extremely large number of data sets considered in this study, one came to several conclusions. It would be nearly impossible to select six to ten bridges to represent the entire South Dakota bridge system. For each truck configuration, a different allowable weight was calculated for every bridge in the system. There were no trends. Also, one truck configuration was not critical for all bridges. When one considers geography with the calculated data, it was obvious that the allowable load for each truck configuration is dependent upon the path taken by a particular truck configuration.

Based on these observations, the project team took an approach of looking at the entire bridge system as a single system. Thus, there are cases were a particular truck might significantly overload a particular bridge. While the degree of overload would be monitored, it would be unduly conservative to base the resulting studies considering the worst truck configuration would only travel over the worst bridge.

Task 5 Determine the extent of usage of non-standard vehicles and the possibility of increased usage.

A list of trucking firms located in South Dakota, or that use South Dakota highways, was provided by the Technical Panel to the project team. Each firm was contacted and asked to fill out a survey questionnaire. A follow up phone call was made to each firm to encourage response to the survey. The purpose of the survey was to determine the current usage and estimated future usage of non-standard trucks.

Two separate survey forms were sent to each company, a detailed form and a summary form. The detailed form was the preferred form, but the summary form was acceptable. Sample detailed and summary forms are included in the following pages.

Four firms responded to the survey. Two companies responded by providing the detailed form and two companies provided the summary form. The data from the survey has been compiled for presentation.

Thirty-two (32) trucks were described in the returned surveys. These trucks ranged from 74 feet to 97 feet in length. Length is defined as the center to center distance from the front axle to the rear most axle. The trucks had from 8 to 15 axles. The specifications for each truck are shown in Table 5-1.

Number of Trucks In Group	*Length (feet)*	*Number of Axles*	*Maximum Gross Weight*	*Total 1998 Mileage*	*Total Estimate 2003 Mileage*
2	74	8	106,000	114,400	120,000
12	76.3	9	117,000	1,089,400	1,198,000
1	94	11	135,000	19,600	50,000
10	94.3	13	148,000	1,228,500	1,351,000
2	91	13	141,000	143,100	145,000
2	95	14	151,000	130,600	135,000
3	97	15	159,000	197,600	205,000

Table 5-1 Survey Results

The survey forms also requested information on the mileage from 1998 and the estimated annual mileage by 2003. The increase in mileage for the five-year period ranged from 1.3 percent to 10.0 percent. Every response indicated an estimated increase in usage of non-standard trucks over the next five years.

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(785) 865 – 1436

April 21, 1999

«Name»
«Company»
«Address»
«City», «State» «Zip»

Dear Sir:

EnGraph is presently conducting a research project with the South Dakota Department of Transportation. As one of the tasks, we are required to estimate the present and future travel of commercial vehicles within the state of South Dakota. To accurately accomplish this goal, we solicit your assistance.

To make this questionnaire as convenient as possible, we are providing you with two options. If the data is readily available, the Detail Form is desired. However, if you would like to submit the Summary Form, that is acceptable. Please do **NOT** do both. To make it easier, you may combine your vehicles into groups. For purposes of our research project, a group of trucks would have similar lengths, number of axles, axle spacing and gross vehicle weight when loaded. For each single vehicle, or group, we request the following on the Summary Form: number of vehicles, length between the front and rear axles (or length between axles), gross vehicle weight, actual 1998 Interstate and "other" highway mileage and an estimated mileage in the year 2003. On the Detail Form similar information is requested with the following exception, we would like to know the spacing between each axle.

To make the questionnaire easier, we have prepared a drawing of three typical trucks. The data for each truck is included on the forms.

We would appreciate attachment of your name on the questionnaire for our control purposes. When we compile the results, they will be completely anonymous. In fact, we will not share the raw responses with the SDDOT unless we have your permission. If you have any questions, please do not hesitate to call.

Would you please submit this questionnaire by **MAY 3, 1999**. Thank you for your assistance in our research.

Very truly yours,

Carl E. Kurt
President, EnGraph

Enclosure:

Summary Form	South Dakota Truck Usage								
	Group i *	Group ii *	Group iii *	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
Front/Rear Axle Length, ft	49.5	49	97.5						
Number of Axles	5	7	10						
Number of Vehicles in Group	4	5	1						
Maximum Gross Vehicle Weight, lbs	82,000	126,500	125,000						
Actual 1998 Interstate Mileage in South Dakota for Group	255,000	300,500	100,000						
Actual 1998 "Other Highway" Mileage in South Dakota for Group	100,000	155,600	5,000						
Estimated 2003 Total Mileage in South Dakota for Group	400,000	650,000	120,000						

*** See attached Sheet for Examples**

Name	
Company	
Address	
City	
State	SD
ZIP	
Phone	

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Please Submit by May 3, 1999

Detail Form South Dakota Truck Usage

Axle ID	Distance Between Axles, feet									
	Group i*	Group ii*	Group iii*	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7
Axle 1	11.5	12	11.5							
Axle 2	4	4	4							
Axle 3	30	4	26							
Axle 4	4	4	4							
Axle 5		15	4							
Axle 6		10	10							
Axle 7			4							
Axle 8			28							
Axle 9			4							
Axle 10										
Axle 11										
Axle 12										
Axle 13										
Number of Vehicles in Group	4	5	1							
Maximum Gross Vehicle Weight, lbs	82,000	126,500	125,000							
Actual 1998 Interstate Mileage in South Dakota for Group	255,000	300,500	100,000							
Actual 1998 "Other Highway" Mileage in South Dakota for Group	100,000	155,600	5,000							
Estimated 2003 Total Mileage in South Dakota for Group	400,000	650,000	120,000							

Name	
Company	
Address	
City	
State	SD
ZIP	
Phone	

*** See attached sheet for examples**

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Please Submit by **May 1, 1999**

Task 6 Determine limits on weight and axle configuration of vehicles that will better ensure bridges meet their design life

6.1 Evaluation of Current Bridge Gross Weight Formula

Before developing a new formula, the behavior of the current Bridge Gross Weight Formula in screening trucks and the resulting consequences were identified. This was accomplished by comparing the calculated allowable gross vehicle weight found in Task 4 to the estimated gross vehicle weight given by the current bridge formula.

As will be justified later, this formula allows too much weight on bridges for many trucks. The general problem is with the longer non-standard trucks. Shorter trucks with fewer axles, like those common at the time of the formula's development, are well served by the formula. They are loaded conservatively in most situations, which is good for extending the bridge life, but limits the service to the trucking industry. The longer non-standard trucks that have emerged since the development of the formula were found to overload many of the existing bridges. The data presented in this section illustrates the problems with the formula, and why a new, or modified formula, is needed to help preserve bridge service life.

There are certain terms used in the presentation of the data that need to be defined. The "average" conditions are based on all 231,552 truck/bridge combinations, while the "maximum" values are obtained from the worst or most critical truck/bridge combination. A bridge is "overloaded" when a truck loads the bridge beyond the specified operating rating. The level of overload is defined as the percent of the actual allowable load that the given truck was overweight. For example, a 110,000 pound truck that is only allowed to carry 100,000 pounds overloads the bridge by ten percent.

The allowable weight based on the Bridge Gross Weight Formula overloaded approximately twelve percent of the truck/bridge combinations in South Dakota. The ten worst trucks, based on the number of bridges overloaded are shown in Table 6-1. The ten worst trucks, based on the maximum level of overload are shown in Table 6-2. In either case, the worst trucks, are long (100.5 feet) with more than 13 or 14 axles.

Truck ID	*Length, ft*	*Number of Axles*	*Number of Bridges Overloaded, %*
99	100.5	14	28.6
98	100.5	13	26.6
108	100.5	15	26.5
107	100.5	14	25.2
54	96.5	13	24.2
126	100.5	16	24.0
63	96.5	14	23.9
53	96.5	12	22.7
97	100.5	12	22.7
125	100.5	15	22.4

Table 6-1 Ten Worst Trucks with Current Bridge Formula Based on Number of Overloaded Bridges

Truck ID	*Length, ft*	*Number of Axles*	*Maximum Level of Overload, %*
108	100.5	15	99.2
99	100.5	14	98.5
126	100.5	16	98.4
135	100.5	17	97.5
88	96.5	14	95.2
117	100.5	15	90.5
125	100.5	15	90.4
90	96.5	16	90.3
107	100.5	14	90.1
98	100.5	13	89.7

Table 6-2 Ten Worst Trucks with Current Bridge Formula Based on Maximum Level of Overloaded

The level of overloading for each truck is shown in Figure 6-1. The average level of overload was approximately fifteen percent. The maximum level of overload, caused by several long trucks with many axles, was ninety-seven percent. This means that the allowable gross vehicle weight using the Bridge Gross Weight Formula was nearly double the allowable gross vehicle weight permitted by the bridge.

The trucks in Figure 6-1 are sorted by increasing length and then by increasing number of axles. It is evident that the short trucks do not create a serious problem for bridges while the long trucks are overloading the bridges beyond an acceptable level. Also, the level of overloading increases as the truck length and number of axles increase.

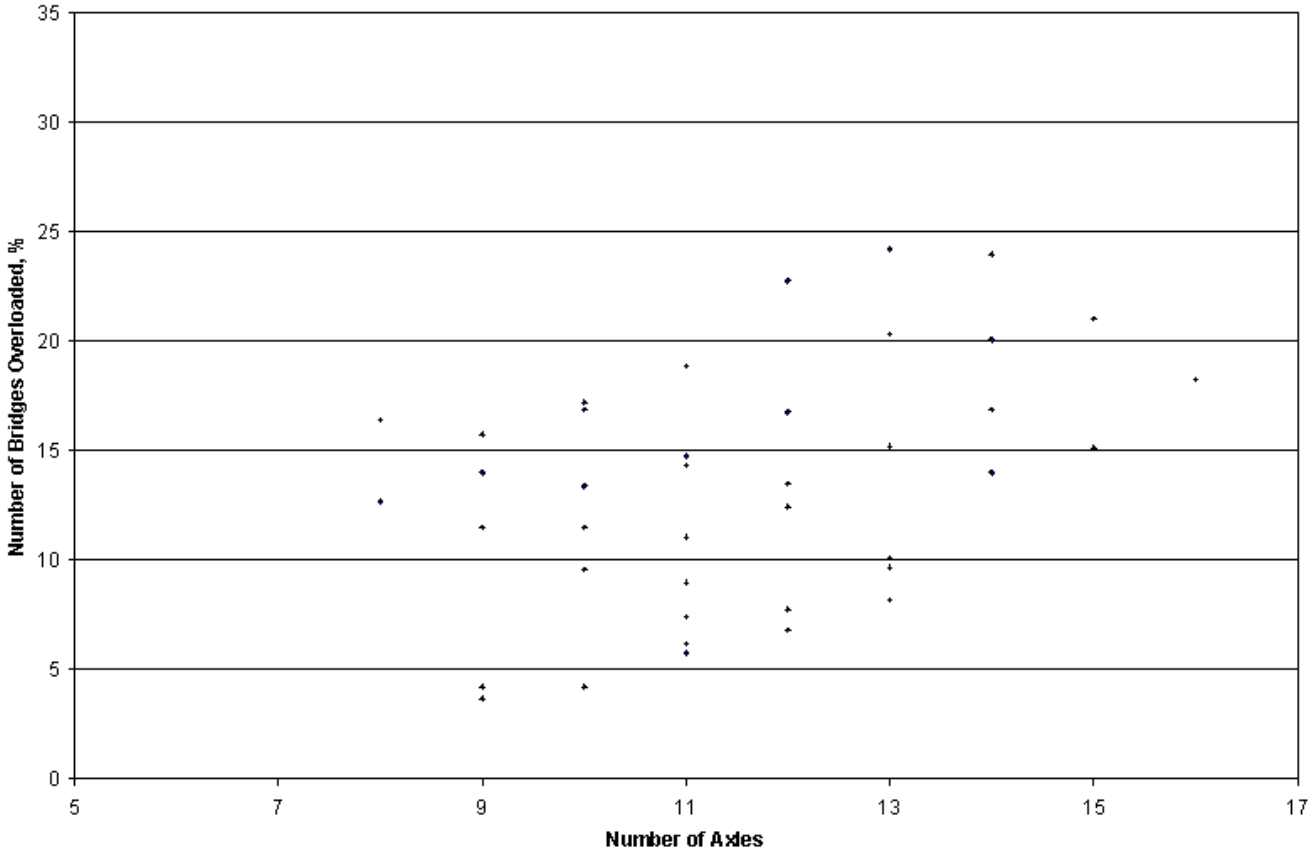

Figure C-2 **Number of Bridges Overloaded By Increasing Number of Axles for 96.5 ft. Trucks Using the Bridge Gross Weight Formula**

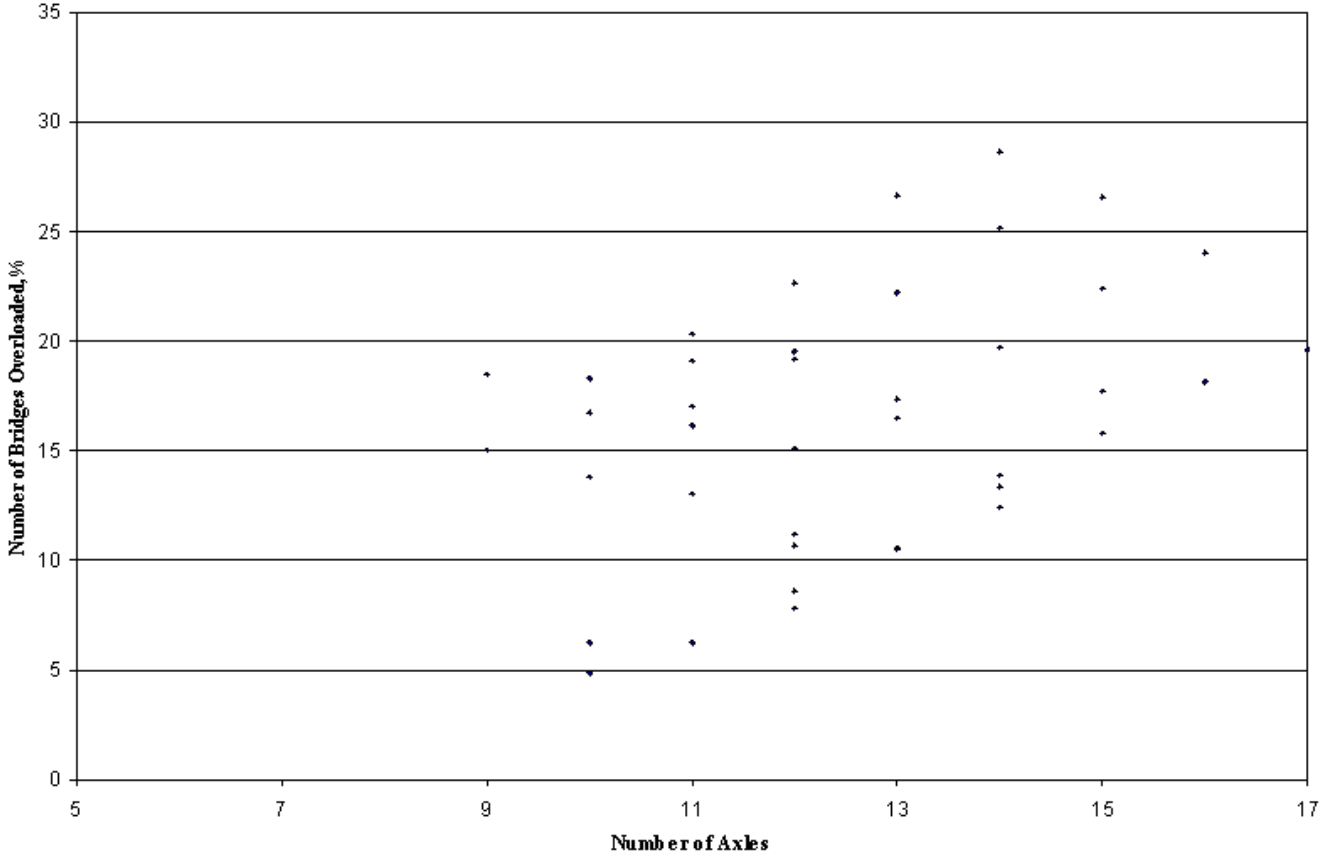

Figure C-3 Number of Bridges Overloaded By Increasing Number of Axles for 100.5 ft. Trucks Using the Bridge Gross Weight Formula

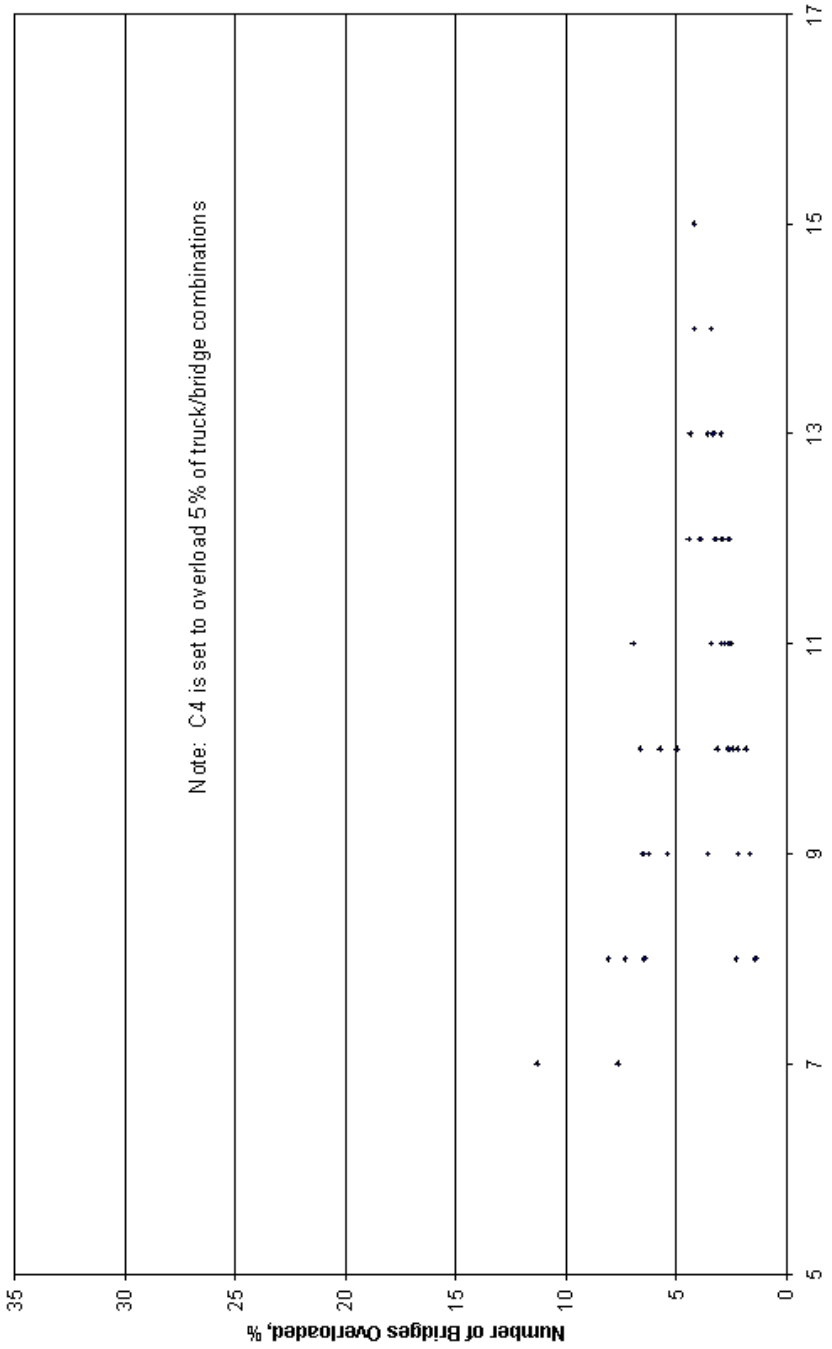

Figure C-4 Number of Bridges Overloaded for All 94 ft. Trucks Using the Modified Bridge Gross Formula

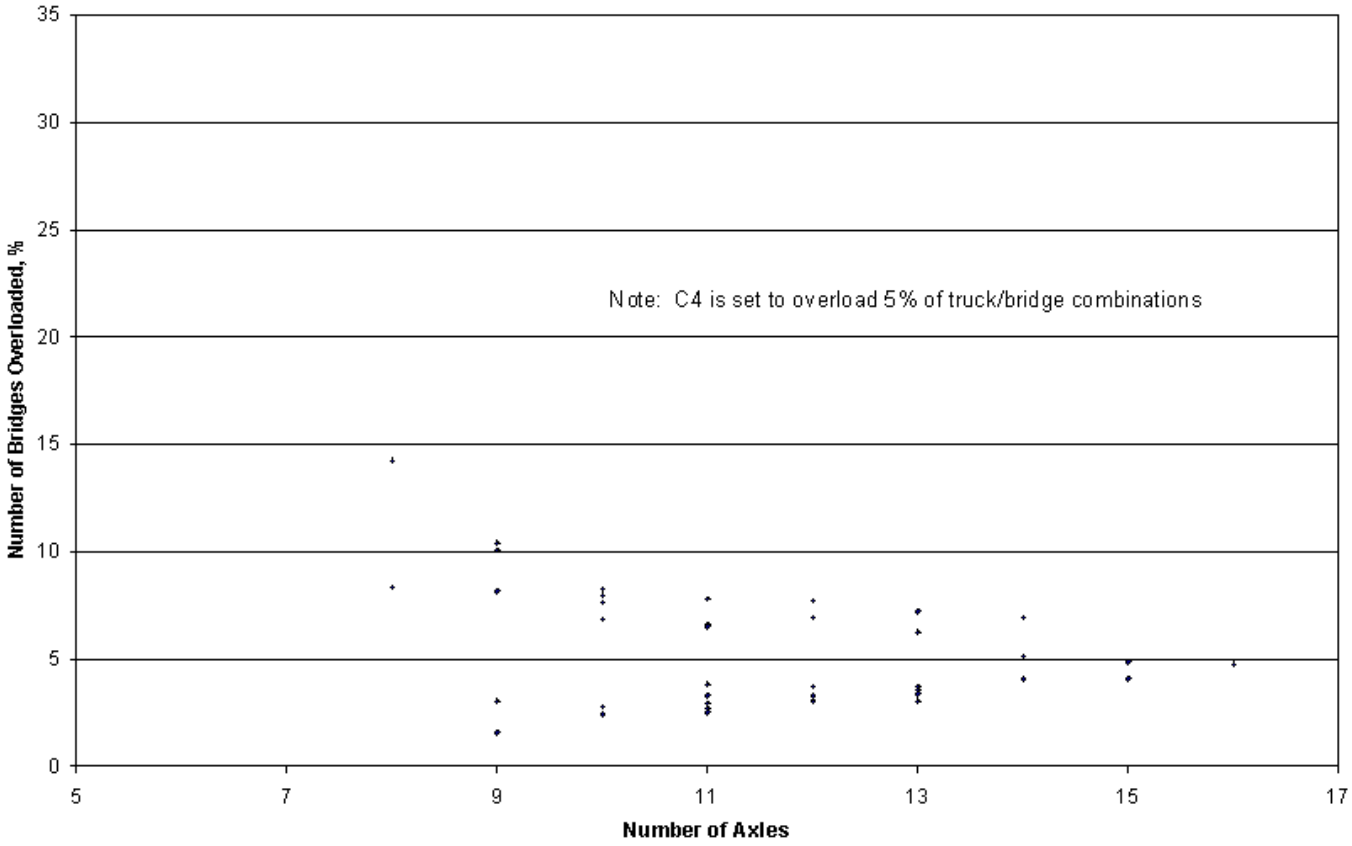

Figure C-5 Number of Bridges Overloaded for All 96.5 ft. Trucks Using the Modified Bridge Gross Formula

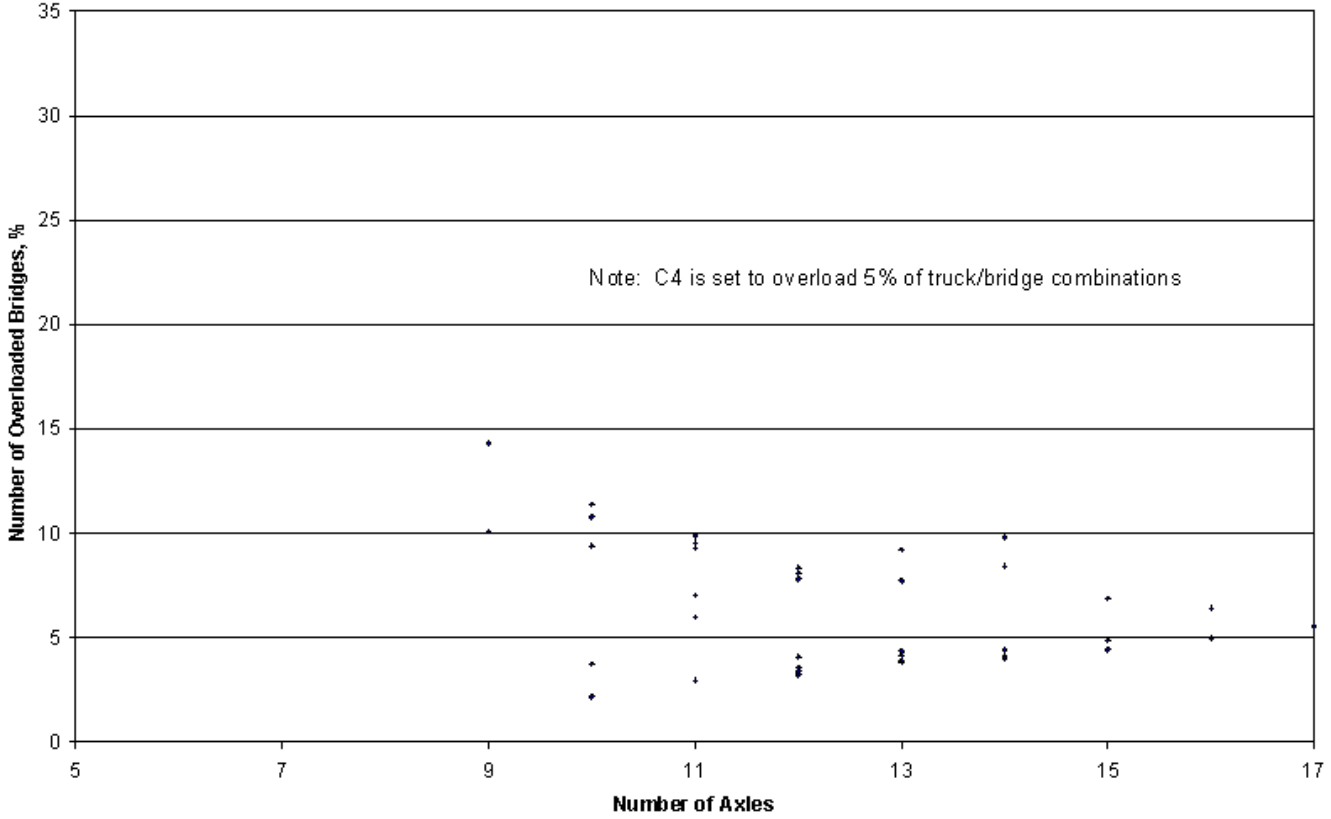

Figure C-6 Number of Bridges Overloaded for All 100.5 ft. Trucks Using the Modified Bridge Gross Formula

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Appendix D

The graphs in Appendix D illustrate the varying amounts of overloaded bridges caused by all trucks at different values of C_4.

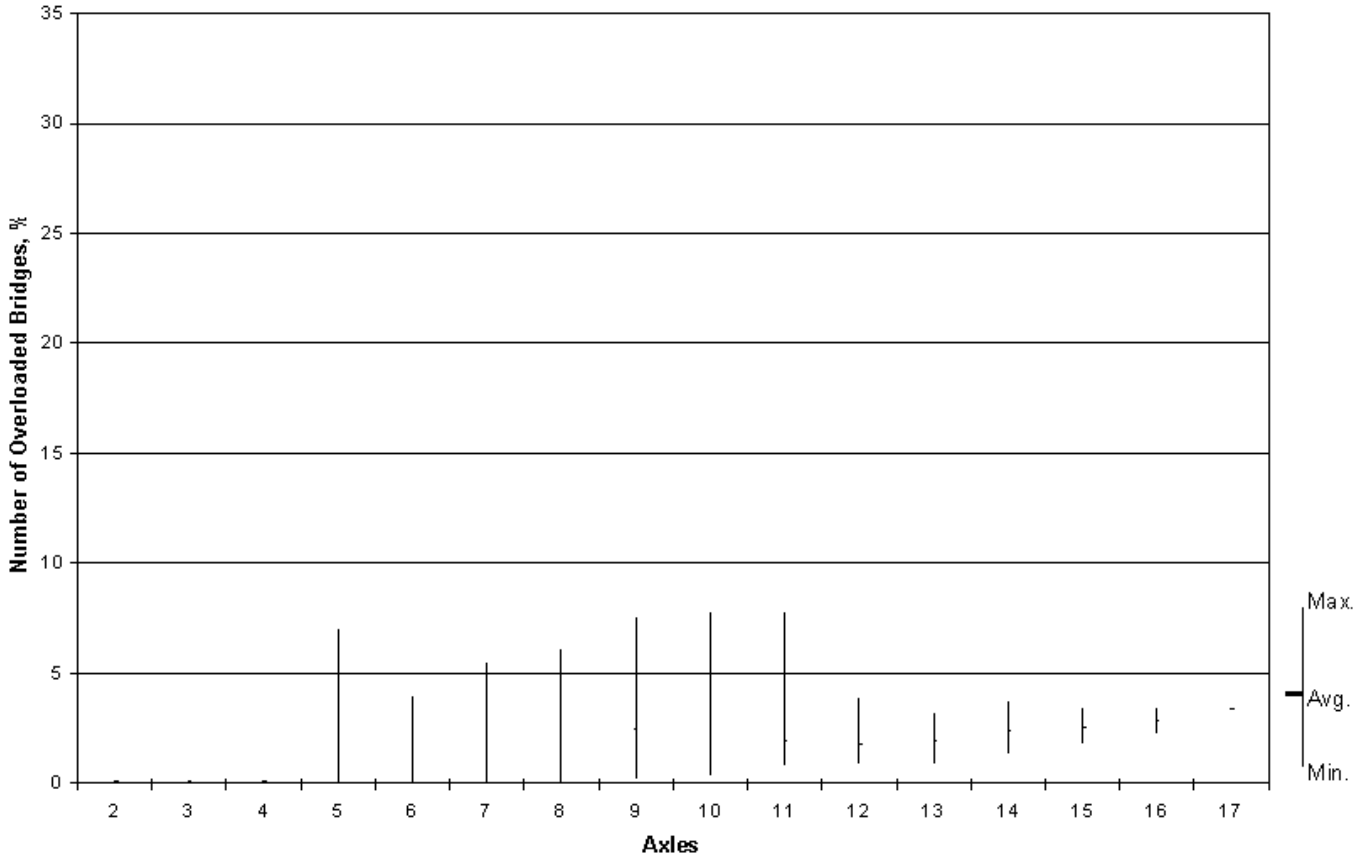

Figure D-1 The Number of Overloaded Bridges by All Trucks - C4 = 21 (2%)

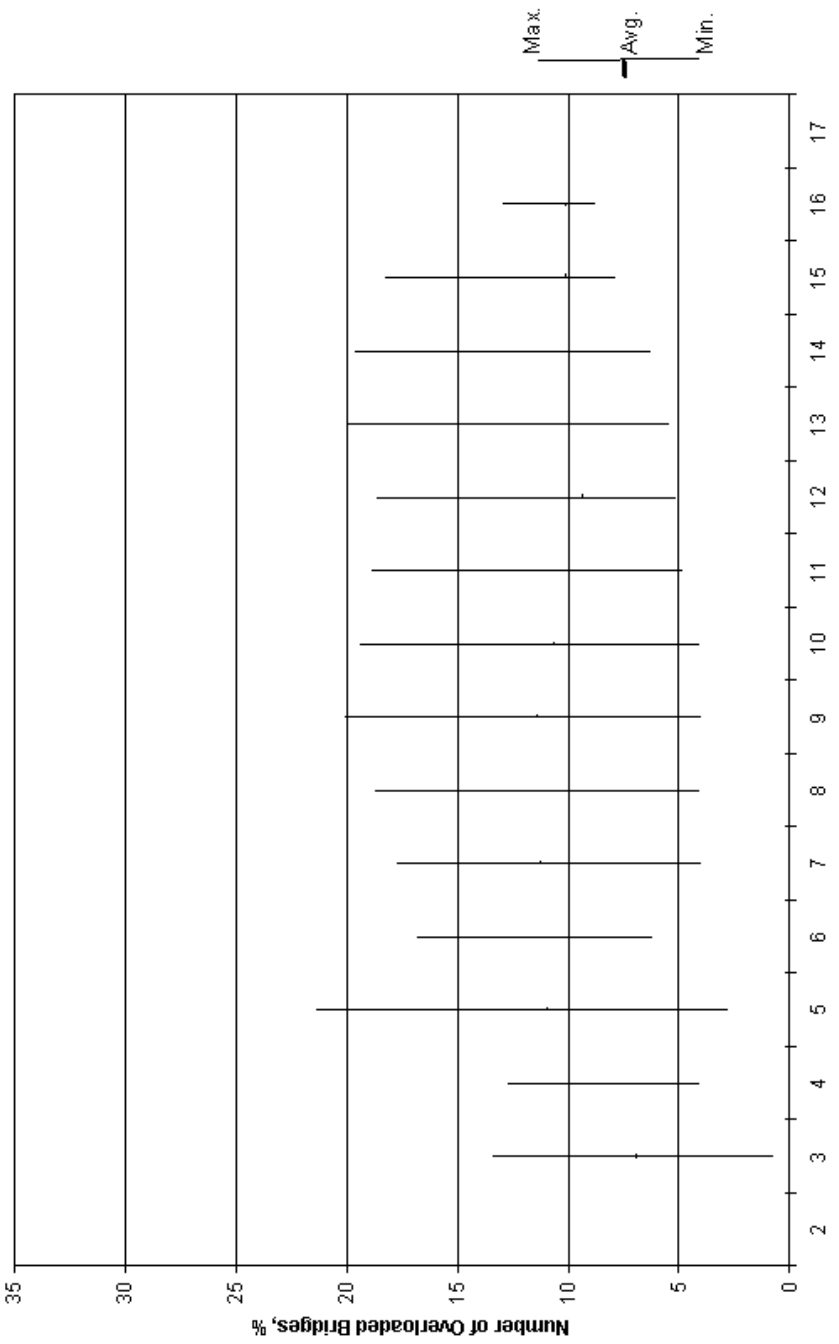

Figure D-2 The Number of Overloaded Bridges by All Trucks - C4 = 48 (10%)

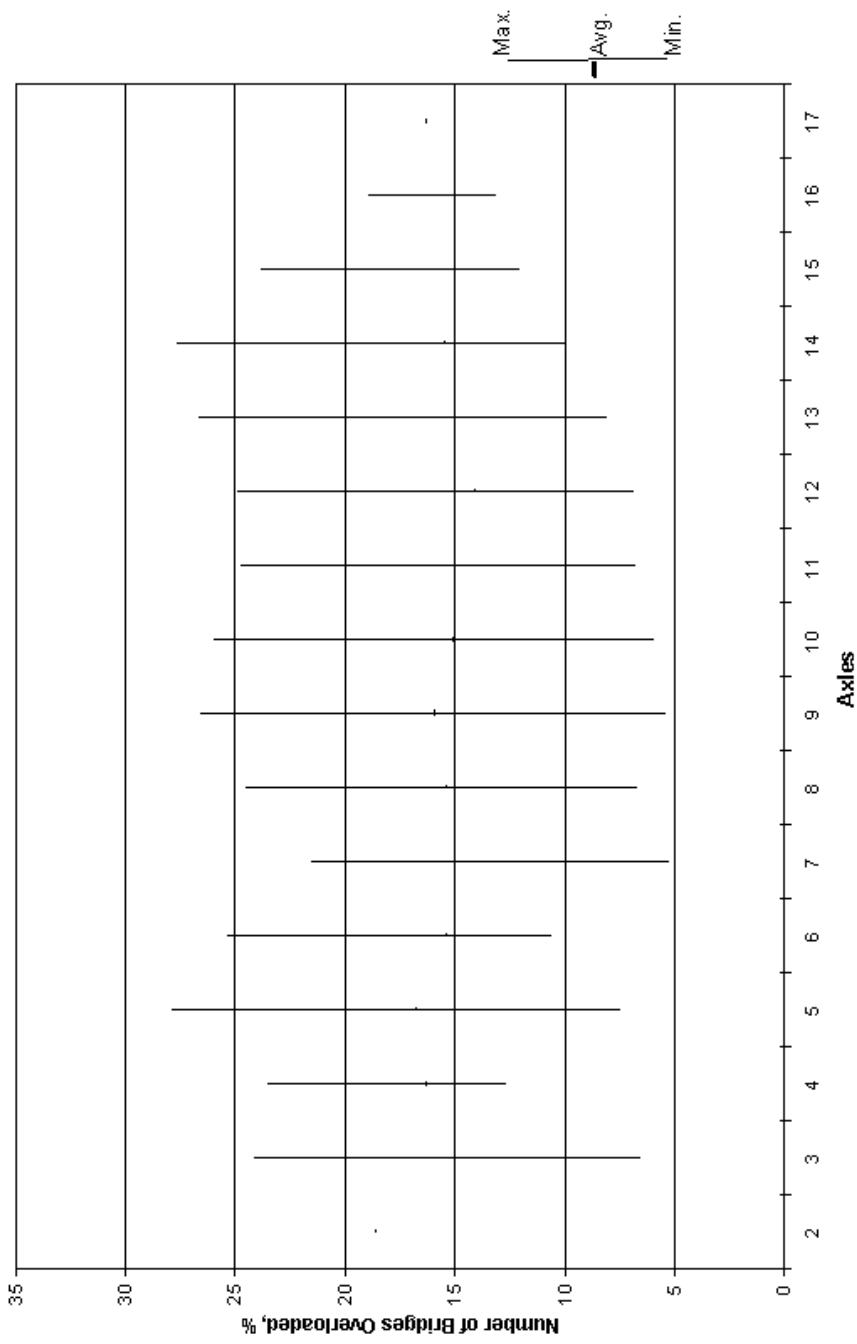

Figure D-3 The Number of Overloaded Bridges by All Trucks - C4 = 57 (15%)

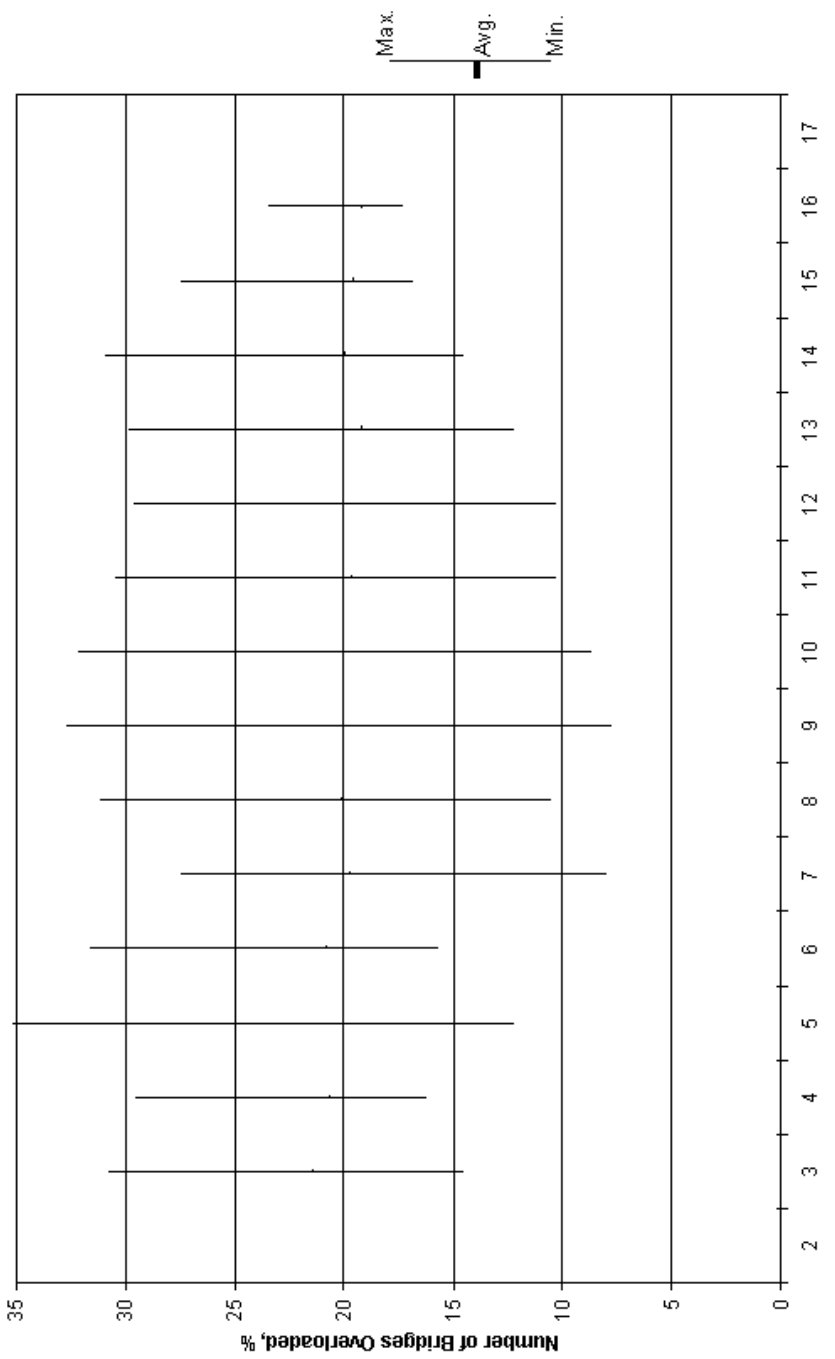

Figure D-4 The Number of Overloaded Bridges by All Trucks - C4 = 65 (20%)

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Appendix E

Appendix E includes tables of the Modified Bridge Formula at different levels of C_4. Also included are tables showing the difference between the Bridge Gross Weight Formula and the Modified Bridge Formula at those levels of C_4. Positive values indicate an addition of weight from the Bridge Gross Weight Formula. Negative values indicate a reduction from the Bridge Gross Weight Formula.

	c4 =	57	(15%)			Number of Axles						
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing			Difference Between Current BGWF and Proposed BGWF - Pounds									
9	1000	17500										
10	0	16500	27000									
11	0	16000	27000									
12	0	15000	27000									
13	0	14500	27000									
14	0	13500	27000	24000								
15	0	13000	27000	24000								
16	0	12000	27000	24000								
17	0	11500	26500	24000	21000							
18	0	10500	26000	24000	21000							
19	0	10000	25500	24000	21000							
20	0	9000	24500	24000	21000	18000						
21	0	8500	24000	24000	21000	18000						
22	0	7500	23500	24000	21000	18000						
23	0	7000	22500	24000	21000	18000						
24	0	6000	22000	24000	21000	18000	15000					
25	0	5500	21500	24000	21000	18000	15000					
26	0	4500	20500	24000	21000	18000	15000					
27	0	4000	20000	24000	21000	18000	15000	12000				
28	0	3000	19500	24000	21000	18000	15000	12000				
29	0	2500	18500	24000	21000	18000	15000	12000				
30	0	1500	18000	24000	21000	18000	15000	12000	9000			
31	0	1000	17500	24000	21000	18000	15000	12000	9000			
32	0	0	16500	24000	21000	18000	15000	12000	9000			
33	0	0	16000	24000	21000	18000	15000	12000	9000			
34	0	0	15500	24000	21000	18000	15000	12000	9000	6000		
35	0	0	14500	24000	21000	18000	15000	12000	9000	6000		
36	0	0	14000	24000	21000	18000	15000	12000	9000	6000		
37	0	0	13500	24000	21000	18000	15000	12000	9000	6000	3000	
38	0	0	12500	24000	21000	18000	15000	12000	9000	6000	3000	
39	0	0	12000	24000	21000	18000	15000	12000	9000	6000	3000	
40	0	0	11500	24000	21000	18000	15000	12000	9000	6000	3000	0
41	0	0	10500	24000	21000	18000	15000	12000	9000	6000	3000	0
42	0	0	10000	24000	21000	18000	15000	12000	9000	6000	3000	0
43	0	0	9500	24000	21000	18000	15000	12000	9000	6000	3000	0
44	0	0	8500	24000	21000	18000	15000	12000	9000	6000	3000	0
45	0	0	8000	24000	21000	18000	15000	12000	9000	6000	3000	0
46	0	0	7500	23500	21000	18000	15000	12000	9000	6000	3000	0
47	0	0	6500	22500	21000	18000	15000	12000	9000	6000	3000	0
48	0	0	6000	22000	21000	18000	15000	12000	9000	6000	3000	0
49	0	0	5500	21500	21000	18000	15000	12000	9000	6000	3000	0
50	0	0	4500	21000	21000	18000	15000	12000	9000	6000	3000	0
51	0	0	4000	20000	21000	18000	15000	12000	9000	6000	3000	0
52	0	0	3500	19500	21000	18000	15000	12000	9000	6000	3000	0
53	0	0	2500	19000	21000	18000	15000	12000	9000	6000	3000	0
54	0	0	2000	18500	21000	18000	15000	12000	9000	6000	3000	0
55	0	0	1500	17500	21000	18000	15000	12000	9000	6000	3000	0
56	0	0	500	17000	21000	18000	15000	12000	9000	6000	3000	0
57	0	0	0	16500	21000	18000	15000	12000	9000	6000	3000	0
58	0	0	0	16000	21000	18000	15000	12000	9000	6000	3000	0
59	0	0	0	15000	21000	18000	15000	12000	9000	6000	3000	0
60	0	0	0	14500	21000	18000	15000	12000	9000	6000	3000	0
61	0	0	0	14000	21000	18000	15000	12000	9000	6000	3000	0
62	0	0	0	13500	21000	18000	15000	12000	9000	6000	3000	0
63	0	0	0	12500	21000	18000	15000	12000	9000	6000	3000	0
64	0	0	0	12000	21000	18000	15000	12000	9000	6000	3000	0

	c4 =	57	(15%)			Number of Axles						
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing			Difference Between Current BGWF and Proposed BGWF - Pounds									
65	0	0	0	11500	21000	18000	15000	12000	9000	6000	3000	0
66	0	0	0	11000	21000	18000	15000	12000	9000	6000	3000	0
67	0	0	0	10000	21000	18000	15000	12000	9000	6000	3000	0
68	0	0	0	9500	21000	18000	15000	12000	9000	6000	3000	0
69	0	0	0	9000	21000	18000	15000	12000	9000	6000	3000	0
70	0	0	0	8500	21000	18000	15000	12000	9000	6000	3000	0
71	0	0	0	7500	21000	18000	15000	12000	9000	6000	3000	0
72	0	0	0	7000	21000	18000	15000	12000	9000	6000	3000	0
73	0	0	0	6500	21000	18000	15000	12000	9000	6000	3000	0
74	0	0	0	6000	21000	18000	15000	12000	9000	6000	3000	0
75	0	0	0	5000	21000	18000	15000	12000	9000	6000	3000	0
76	0	0	0	4500	20500	18000	15000	12000	9000	6000	3000	0
77	0	0	0	4000	20000	18000	15000	12000	9000	6000	3000	0
78	0	0	0	3500	19000	18000	15000	12000	9000	6000	3000	0
79	0	0	0	2500	18500	18000	15000	12000	9000	6000	3000	0
80	0	0	0	2000	18000	18000	15000	12000	9000	6000	3000	0
81	0	0	0	1500	17500	18000	15000	12000	9000	6000	3000	0
82	0	0	0	1000	17000	18000	15000	12000	9000	6000	3000	0
83	0	0	0	0	16000	18000	15000	12000	9000	6000	3000	0
84	0	0	0	0	15500	18000	15000	12000	9000	6000	3000	0
85	0	0	0	0	15000	18000	15000	12000	9000	6000	3000	0
86	0	0	0	0	14500	18000	15000	12000	9000	6000	3000	0
87	0	0	0	0	14000	18000	15000	12000	9000	6000	3000	0
88	0	0	0	0	13000	18000	15000	12000	9000	6000	3000	0
89	0	0	0	0	12500	18000	15000	12000	9000	6000	3000	0
90	0	0	0	0	12000	18000	15000	12000	9000	6000	3000	0
91	0	0	0	0	11500	18000	15000	12000	9000	6000	3000	0
92	0	0	0	0	11000	18000	15000	12000	9000	6000	3000	0
93	0	0	0	0	10000	18000	15000	12000	9000	6000	3000	0
94	0	0	0	0	9500	18000	15000	12000	9000	6000	3000	0
95	0	0	0	0	9000	18000	15000	12000	9000	6000	3000	0
96	0	0	0	0	8500	18000	15000	12000	9000	6000	3000	0
97	0	0	0	0	8000	18000	15000	12000	9000	6000	3000	0
98	0	0	0	0	7000	18000	15000	12000	9000	6000	3000	0
99	0	0	0	0	6500	18000	15000	12000	9000	6000	3000	0
100	0	0	0	0	6000	18000	15000	12000	9000	6000	3000	0
101	0	0	0	0	5500	18000	15000	12000	9000	6000	3000	0
102	0	0	0	0	5000	18000	15000	12000	9000	6000	3000	0
103	0	0	0	0	4000	18000	15000	12000	9000	6000	3000	0
104	0	0	0	0	3500	18000	15000	12000	9000	6000	3000	0
105	0	0	0	0	3000	18000	15000	12000	9000	6000	3000	0
106	0	0	0	0	2500	18000	15000	12000	9000	6000	3000	0
107	0	0	0	0	2000	17500	15000	12000	9000	6000	3000	0
108	0	0	0	0	1000	17000	15000	12000	9000	6000	3000	0
109	0	0	0	0	500	16500	15000	12000	9000	6000	3000	0
110	0	0	0	0	0	16000	15000	12000	9000	6000	3000	0

Table E-1 Difference Between Current BGWF and Modified Formula with C4 = 57

	c4 =	57	(15%)	Number of Axles								
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing	Maximum Gross Weight - Pounds											
9	40000	60000										
10	40000	60000	75500									
11	40000	60000	76500									
12	40000	60000	77000									
13	40000	60000	77500									
14	40000	60000	78500	80500								
15	40000	60000	79000	81500								
16	40000	60000	79500	82000								
17	40000	60000	80000	82500	85000							
18	40000	60000	80000	83000	86000							
19	40000	60000	80000	84000	86500							
20	40000	60000	80000	84500	87000	89500						
21	40000	60000	80000	85000	87500	90000						
22	40000	60000	80000	85500	88000	91000						
23	40000	60000	80000	86500	89000	91500						
24	40000	60000	80000	87000	89500	92000	94500					
25	40000	60000	80000	87500	90000	92500	95500					
26	40000	60000	80000	88000	90500	93000	96000					
27	40000	60000	80000	89000	91000	93500	96500	99000				
28	40000	60000	80000	89500	92000	94500	97000	99500				
29	40000	60000	80000	90000	92500	95000	97500	100500				
30	40000	60000	80000	90500	93000	95500	98000	101000	103500			
31	40000	60000	80000	91500	93500	96000	98500	101500	104000			
32	40000	60000	80000	92000	94000	96500	99500	102000	105000			
33	40000	60000	80000	92500	95000	97000	100000	102500	105500			
34	40000	60000	80000	93000	95500	98000	100500	103000	106000	108500		
35	40000	60000	80000	94000	96000	98500	101000	103500	106500	109000		
36	40000	60000	80000	94500	96500	99000	101500	104000	107000	110000		
37	40000	60000	80000	95000	97000	99500	102000	105000	107500	110500	113000	
38	40000	60000	80000	95500	98000	100000	102500	105500	108000	111000	113500	
39	40000	60000	80000	96500	98500	100500	103500	106000	108500	111500	114500	
40	40000	60000	80000	97000	99000	101500	104000	106500	109000	112000	115000	117500
41	40000	60000	80000	97500	99500	102000	104500	107000	110000	112500	115500	118000
42	40000	60000	80000	98000	100000	102500	105000	107500	110500	113000	116000	118500
43	40000	60000	80000	99000	101000	103000	105500	108000	111000	113500	116500	119500
44	40000	60000	80000	99500	101500	103500	106000	108500	111500	114000	117000	120000
45	40000	60000	80000	100000	102000	104000	106500	109500	112000	114500	117500	120500
46	40000	60000	80000	100000	102500	105000	107500	110000	112500	115500	118000	121000
47	40000	60000	80000	100000	103000	105500	108000	110500	113000	116000	118500	121500
48	40000	60000	80000	100000	104000	106000	108500	111000	113500	116500	119000	122000
49	40000	60000	80000	100000	104500	106500	109000	111500	114000	117000	119500	122500
50	40000	60000	80000	100000	105000	107000	109500	112000	115000	117500	120500	123000
51	40000	60000	80000	100000	105500	107500	110000	112500	115500	118000	121000	123500
52	40000	60000	80000	100000	106000	108500	110500	113000	116000	118500	121500	124000
53	40000	60000	80000	100000	107000	109000	111500	114000	116500	119000	122000	124500
54	40000	60000	80000	100000	107500	109500	112000	114500	117000	119500	122500	125000
55	40000	60000	80000	100000	108000	110000	112500	115000	117500	120000	123000	126000
56	40000	60000	80000	100000	108500	110500	113000	115500	118000	121000	123500	126500
57	40000	60000	80000	100000	109000	111000	113500	116000	118500	121500	124000	127000
58	40000	60000	80000	100000	110000	112000	114000	116500	119000	122000	124500	127500
59	40000	60000	80000	100000	110500	112500	114500	117000	120000	122500	125000	128000
60	40000	60000	80000	100000	111000	113000	115500	117500	120500	123000	125500	128500
61	40000	60000	80000	100000	111500	113500	116000	118500	121000	123500	126500	129000
62	40000	60000	80000	100000	112000	114000	116500	119000	121500	124000	127000	129500
63	40000	60000	80000	100000	113000	114500	117000	119500	122000	124500	127500	130000
64	40000	60000	80000	100000	113500	115500	117500	120000	122500	125000	128000	130500

	c4 =	57	(15%)	Number of Axles								
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing	Maximum Gross Weight - Pounds											
65	40000	60000	80000	100000	114000	116000	118000	120500	123000	125500	128500	131000
66	40000	60000	80000	100000	114500	116500	118500	121000	123500	126500	129000	131500
67	40000	60000	80000	100000	115000	117000	119500	121500	124000	127000	129500	132500
68	40000	60000	80000	100000	116000	117500	120000	122000	125000	127500	130000	133000
69	40000	60000	80000	100000	116500	118000	120500	123000	125500	128000	130500	133500
70	40000	60000	80000	100000	117000	119000	121000	123500	126000	128500	131000	134000
71	40000	60000	80000	100000	117500	119500	121500	124000	126500	129000	131500	134500
72	40000	60000	80000	100000	118000	120000	122000	124500	127000	129500	132500	135000
73	40000	60000	80000	100000	119000	120500	122500	125000	127500	130000	133000	135500
74	40000	60000	80000	100000	119500	121000	123500	125500	128000	130500	133500	136000
75	40000	60000	80000	100000	120000	121500	124000	126000	128500	131000	134000	136500
76	40000	60000	80000	100000	120000	122500	124500	126500	129000	132000	134500	137000
77	40000	60000	80000	100000	120000	123000	125000	127500	130000	132500	135000	137500
78	40000	60000	80000	100000	120000	123500	125500	128000	130500	133000	135500	138000
79	40000	60000	80000	100000	120000	124000	126000	128500	131000	133500	136000	139000
80	40000	60000	80000	100000	120000	124500	126500	129000	131500	134000	136500	139500
81	40000	60000	80000	100000	120000	125000	127500	129500	132000	134500	137000	140000
82	40000	60000	80000	100000	120000	126000	128000	130000	132500	135000	137500	140500
83	40000	60000	80000	100000	120000	126500	128500	130500	133000	135500	138500	141000
84	40000	60000	80000	100000	120000	127000	129000	131000	133500	136000	139000	141500
85	40000	60000	80000	100000	120000	127500	129500	132000	134000	136500	139500	142000
86	40000	60000	80000	100000	120000	128000	130000	132500	135000	137500	140000	142500
87	40000	60000	80000	100000	120000	128500	130500	133000	135500	138000	140500	143000
88	40000	60000	80000	100000	120000	129500	131500	133500	136000	138500	141000	143500
89	40000	60000	80000	100000	120000	130000	132000	134000	136500	139000	141500	144000
90	40000	60000	80000	100000	120000	130500	132500	134500	137000	139500	142000	144500
91	40000	60000	80000	100000	120000	131000	133000	135000	137500	140000	142500	145500
92	40000	60000	80000	100000	120000	131500	133500	135500	138000	140500	143000	146000
93	40000	60000	80000	100000	120000	132000	134000	136500	138500	141000	143500	146500
94	40000	60000	80000	100000	120000	133000	134500	137000	139000	141500	144500	147000
95	40000	60000	80000	100000	120000	133500	135500	137500	140000	142000	145000	147500
96	40000	60000	80000	100000	120000	134000	136000	138000	140500	143000	145500	148000
97	40000	60000	80000	100000	120000	134500	136500	138500	141000	143500	146000	148500
98	40000	60000	80000	100000	120000	135000	137000	139000	141500	144000	146500	149000
99	40000	60000	80000	100000	120000	135500	137500	139500	142000	144500	147000	149500
100	40000	60000	80000	100000	120000	136500	138000	140000	142500	145000	147500	150000
101	40000	60000	80000	100000	120000	137000	138500	141000	143000	145500	148000	150500
102	40000	60000	80000	100000	120000	137500	139500	141500	143500	146000	148500	151000
103	40000	60000	80000	100000	120000	138000	140000	142000	144000	146500	149000	152000
104	40000	60000	80000	100000	120000	138500	140500	142500	145000	147000	149500	152500
105	40000	60000	80000	100000	120000	139000	141000	143000	145500	147500	150500	153000
106	40000	60000	80000	100000	120000	140000	141500	143500	146000	148500	151000	153500
107	40000	60000	80000	100000	120000	140000	142000	144000	146500	149000	151500	154000
108	40000	60000	80000	100000	120000	140000	142500	144500	147000	149500	152000	154500
109	40000	60000	80000	100000	120000	140000	143500	145500	147500	150000	152500	155000
110	40000	60000	80000	100000	120000	140000	144000	146000	148000	150500	153000	155500

Table E-2 Maximum Gross Weight Using Modified Formula with C4 = 57

	c4 =	48	(10%)	Number of Axles								
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing	Difference Between Current BGWF and Proposed BGWF - Pounds											
9	1000	17500										
10	0	16500	18000									
11	0	16000	18000									
12	0	15000	18000									
13	0	14500	18000									
14	0	13500	18000	15000								
15	0	13000	18000	15000								
16	0	12000	18000	15000								
17	0	11500	18000	15000	12000							
18	0	10500	18000	15000	12000							
19	0	10000	18000	15000	12000							
20	0	9000	18000	15000	12000	9000						
21	0	8500	18000	15000	12000	9000						
22	0	7500	18000	15000	12000	9000						
23	0	7000	18000	15000	12000	9000						
24	0	6000	18000	15000	12000	9000	6000					
25	0	5500	18000	15000	12000	9000	6000					
26	0	4500	18000	15000	12000	9000	6000					
27	0	4000	18000	15000	12000	9000	6000	3000				
28	0	3000	18000	15000	12000	9000	6000	3000				
29	0	2500	18000	15000	12000	9000	6000	3000				
30	0	1500	18000	15000	12000	9000	6000	3000	0			
31	0	1000	17500	15000	12000	9000	6000	3000	0			
32	0	0	16500	15000	12000	9000	6000	3000	0			
33	0	0	16000	15000	12000	9000	6000	3000	0			
34	0	0	15500	15000	12000	9000	6000	3000	0	-3000		
35	0	0	14500	15000	12000	9000	6000	3000	0	-3000		
36	0	0	14000	15000	12000	9000	6000	3000	0	-3000		
37	0	0	13500	15000	12000	9000	6000	3000	0	-3000	-6000	
38	0	0	12500	15000	12000	9000	6000	3000	0	-3000	-6000	
39	0	0	12000	15000	12000	9000	6000	3000	0	-3000	-6000	
40	0	0	11500	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
41	0	0	10500	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
42	0	0	10000	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
43	0	0	9500	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
44	0	0	8500	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
45	0	0	8000	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
46	0	0	7500	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
47	0	0	6500	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
48	0	0	6000	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
49	0	0	5500	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
50	0	0	4500	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
51	0	0	4000	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
52	0	0	3500	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
53	0	0	2500	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
54	0	0	2000	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
55	0	0	1500	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
56	0	0	500	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
57	0	0	0	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
58	0	0	0	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
59	0	0	0	15000	12000	9000	6000	3000	0	-3000	-6000	-9000
60	0	0	0	14500	12000	9000	6000	3000	0	-3000	-6000	-9000
61	0	0	0	14000	12000	9000	6000	3000	0	-3000	-6000	-9000
62	0	0	0	13500	12000	9000	6000	3000	0	-3000	-6000	-9000
63	0	0	0	12500	12000	9000	6000	3000	0	-3000	-6000	-9000
64	0	0	0	12000	12000	9000	6000	3000	0	-3000	-6000	-9000

	c4 =	48	(10%)	Number of Axles								
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing	Difference Between Current BGWF and Proposed BGWF - Pounds											
65	0	0	0	11500	12000	9000	6000	3000	0	-3000	-6000	-9000
66	0	0	0	11000	12000	9000	6000	3000	0	-3000	-6000	-9000
67	0	0	0	10000	12000	9000	6000	3000	0	-3000	-6000	-9000
68	0	0	0	9500	12000	9000	6000	3000	0	-3000	-6000	-9000
69	0	0	0	9000	12000	9000	6000	3000	0	-3000	-6000	-9000
70	0	0	0	8500	12000	9000	6000	3000	0	-3000	-6000	-9000
71	0	0	0	7500	12000	9000	6000	3000	0	-3000	-6000	-9000
72	0	0	0	7000	12000	9000	6000	3000	0	-3000	-6000	-9000
73	0	0	0	6500	12000	9000	6000	3000	0	-3000	-6000	-9000
74	0	0	0	6000	12000	9000	6000	3000	0	-3000	-6000	-9000
75	0	0	0	5000	12000	9000	6000	3000	0	-3000	-6000	-9000
76	0	0	0	4500	12000	9000	6000	3000	0	-3000	-6000	-9000
77	0	0	0	4000	12000	9000	6000	3000	0	-3000	-6000	-9000
78	0	0	0	3500	12000	9000	6000	3000	0	-3000	-6000	-9000
79	0	0	0	2500	12000	9000	6000	3000	0	-3000	-6000	-9000
80	0	0	0	2000	12000	9000	6000	3000	0	-3000	-6000	-9000
81	0	0	0	1500	12000	9000	6000	3000	0	-3000	-6000	-9000
82	0	0	0	1000	12000	9000	6000	3000	0	-3000	-6000	-9000
83	0	0	0	0	12000	9000	6000	3000	0	-3000	-6000	-9000
84	0	0	0	0	12000	9000	6000	3000	0	-3000	-6000	-9000
85	0	0	0	0	12000	9000	6000	3000	0	-3000	-6000	-9000
86	0	0	0	0	12000	9000	6000	3000	0	-3000	-6000	-9000
87	0	0	0	0	12000	9000	6000	3000	0	-3000	-6000	-9000
88	0	0	0	0	12000	9000	6000	3000	0	-3000	-6000	-9000
89	0	0	0	0	12000	9000	6000	3000	0	-3000	-6000	-9000
90	0	0	0	0	12000	9000	6000	3000	0	-3000	-6000	-9000
91	0	0	0	0	11500	9000	6000	3000	0	-3000	-6000	-9000
92	0	0	0	0	11000	9000	6000	3000	0	-3000	-6000	-9000
93	0	0	0	0	10000	9000	6000	3000	0	-3000	-6000	-9000
94	0	0	0	0	9500	9000	6000	3000	0	-3000	-6000	-9000
95	0	0	0	0	9000	9000	6000	3000	0	-3000	-6000	-9000
96	0	0	0	0	8500	9000	6000	3000	0	-3000	-6000	-9000
97	0	0	0	0	8000	9000	6000	3000	0	-3000	-6000	-9000
98	0	0	0	0	7000	9000	6000	3000	0	-3000	-6000	-9000
99	0	0	0	0	6500	9000	6000	3000	0	-3000	-6000	-9000
100	0	0	0	0	6000	9000	6000	3000	0	-3000	-6000	-9000
101	0	0	0	0	5500	9000	6000	3000	0	-3000	-6000	-9000
102	0	0	0	0	5000	9000	6000	3000	0	-3000	-6000	-9000
103	0	0	0	0	4000	9000	6000	3000	0	-3000	-6000	-9000
104	0	0	0	0	3500	9000	6000	3000	0	-3000	-6000	-9000
105	0	0	0	0	3000	9000	6000	3000	0	-3000	-6000	-9000
106	0	0	0	0	2500	9000	6000	3000	0	-3000	-6000	-9000
107	0	0	0	0	2000	9000	6000	3000	0	-3000	-6000	-9000
108	0	0	0	0	1000	9000	6000	3000	0	-3000	-6000	-9000
109	0	0	0	0	500	9000	6000	3000	0	-3000	-6000	-9000
110	0	0	0	0	0	9000	6000	3000	0	-3000	-6000	-9000

Table E-3 Difference Between Current BGWF and Modified Formula with C4 = 48

	c4 =	48	(10%)			Number of Axles						
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing				Maximum Gross Weight - Pounds								
9	40000	60000										
10	40000	60000	66500									
11	40000	60000	67500									
12	40000	60000	68000									
13	40000	60000	68500									
14	40000	60000	69500	71500								
15	40000	60000	70000	72500								
16	40000	60000	70500	73000								
17	40000	60000	71500	73500	76000							
18	40000	60000	72000	74000	77000							
19	40000	60000	72500	75000	77500							
20	40000	60000	73500	75500	78000	80500						
21	40000	60000	74000	76000	78500	81000						
22	40000	60000	74500	76500	79000	82000						
23	40000	60000	75500	77500	80000	82500						
24	40000	60000	76000	78000	80500	83000	85500					
25	40000	60000	76500	78500	81000	83500	86500					
26	40000	60000	77500	79000	81500	84000	87000					
27	40000	60000	78000	80000	82000	84500	87500	90000				
28	40000	60000	78500	80500	83000	85500	88000	90500				
29	40000	60000	79500	81000	83500	86000	88500	91500				
30	40000	60000	80000	81500	84000	86500	89000	92000	94500			
31	40000	60000	80000	82500	84500	87000	89500	92500	95000			
32	40000	60000	80000	83000	85000	87500	90500	93000	96000			
33	40000	60000	80000	83500	86000	88000	91000	93500	96500			
34	40000	60000	80000	84000	86500	89000	91500	94000	97000	99500		
35	40000	60000	80000	85000	87000	89500	92000	94500	97500	100000		
36	40000	60000	80000	85500	87500	90000	92500	95000	98000	101000		
37	40000	60000	80000	86000	88000	90500	93000	96000	98500	101500	104000	
38	40000	60000	80000	86500	89000	91000	93500	96500	99000	102000	104500	
39	40000	60000	80000	87500	89500	91500	94500	97000	99500	102500	105500	
40	40000	60000	80000	88000	90000	92500	95000	97500	100000	103000	106000	108500
41	40000	60000	80000	88500	90500	93000	95500	98000	101000	103500	106500	109000
42	40000	60000	80000	89000	91000	93500	96000	98500	101500	104000	107000	109500
43	40000	60000	80000	90000	92000	94000	96500	99000	102000	104500	107500	110500
44	40000	60000	80000	90500	92500	94500	97000	99500	102500	105000	108000	111000
45	40000	60000	80000	91000	93000	95000	97500	100500	103000	105500	108500	111500
46	40000	60000	80000	91500	93500	96000	98500	101000	103500	106500	109000	112000
47	40000	60000	80000	92500	94000	96500	99000	101500	104000	107000	109500	112500
48	40000	60000	80000	93000	95000	97000	99500	102000	104500	107500	110000	113000
49	40000	60000	80000	93500	95500	97500	100000	102500	105000	108000	110500	113500
50	40000	60000	80000	94000	96000	98000	100500	103000	106000	108500	111500	114000
51	40000	60000	80000	95000	96500	98500	101000	103500	106500	109000	112000	114500
52	40000	60000	80000	95500	97000	99500	101500	104000	107000	109500	112500	115000
53	40000	60000	80000	96000	98000	100000	102500	105000	107500	110000	113000	115500
54	40000	60000	80000	96500	98500	100500	103000	105500	108000	110500	113500	116000
55	40000	60000	80000	97500	99000	101000	103500	106000	108500	111000	114000	117000
56	40000	60000	80000	98000	99500	101500	104000	106500	109000	112000	114500	117500
57	40000	60000	80000	98500	100000	102000	104500	107000	109500	112500	115000	118000
58	40000	60000	80000	99000	101000	103000	105000	107500	110000	113000	115500	118500
59	40000	60000	80000	100000	101500	103500	105500	108000	111000	113500	116000	119000
60	40000	60000	80000	100000	102000	104000	106500	108500	111500	114000	116500	119500
61	40000	60000	80000	100000	102500	104500	107000	109500	112000	114500	117500	120000
62	40000	60000	80000	100000	103000	105000	107500	110000	112500	115000	118000	120500
63	40000	60000	80000	100000	104000	105500	108000	110500	113000	115500	118500	121000
64	40000	60000	80000	100000	104500	106500	108500	111000	113500	116000	119000	121500

	c4 =	48	(10%)			Number of Axles						
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing				Maximum Gross Weight - Pounds								
65	40000	60000	80000	100000	105000	107000	109000	111500	114000	116500	119500	122000
66	40000	60000	80000	100000	105500	107500	109500	112000	114500	117500	120000	122500
67	40000	60000	80000	100000	106000	108000	110500	112500	115000	118000	120500	123500
68	40000	60000	80000	100000	107000	108500	111000	113000	116000	118500	121000	124000
69	40000	60000	80000	100000	107500	109000	111500	114000	116500	119000	121500	124500
70	40000	60000	80000	100000	108000	110000	112000	114500	117000	119500	122000	125000
71	40000	60000	80000	100000	108500	110500	112500	115000	117500	120000	122500	125500
72	40000	60000	80000	100000	109000	111000	113000	115500	118000	120500	123500	126000
73	40000	60000	80000	100000	110000	111500	113500	116000	118500	121000	124000	126500
74	40000	60000	80000	100000	110500	112000	114500	116500	119000	121500	124500	127000
75	40000	60000	80000	100000	111000	112500	115000	117000	119500	122000	125000	127500
76	40000	60000	80000	100000	111500	113500	115500	117500	120000	123000	125500	128000
77	40000	60000	80000	100000	112000	114000	116000	118500	121000	123500	126000	128500
78	40000	60000	80000	100000	113000	114500	116500	119000	121500	124000	126500	129000
79	40000	60000	80000	100000	113500	115000	117000	119500	122000	124500	127000	130000
80	40000	60000	80000	100000	114000	115500	117500	120000	122500	125000	127500	130500
81	40000	60000	80000	100000	114500	116000	118500	120500	123000	125500	128000	131000
82	40000	60000	80000	100000	115000	117000	119000	121000	123500	126000	128500	131500
83	40000	60000	80000	100000	116000	117500	119500	121500	124000	126500	129500	132000
84	40000	60000	80000	100000	116500	118000	120000	122000	124500	127000	130000	132500
85	40000	60000	80000	100000	117000	118500	120500	123000	125000	127500	130500	133000
86	40000	60000	80000	100000	117500	119000	121000	123500	126000	128500	131000	133500
87	40000	60000	80000	100000	118000	119500	121500	124000	126500	129000	131500	134000
88	40000	60000	80000	100000	119000	120500	122500	124500	127000	129500	132000	134500
89	40000	60000	80000	100000	119500	121000	123000	125000	127500	130000	132500	135000
90	40000	60000	80000	100000	120000	121500	123500	125500	128000	130500	133000	135500
91	40000	60000	80000	100000	120000	122000	124000	126000	128500	131000	133500	136500
92	40000	60000	80000	100000	120000	122500	124500	126500	129000	131500	134000	137000
93	40000	60000	80000	100000	120000	123000	125000	127500	129500	132000	134500	137500
94	40000	60000	80000	100000	120000	124000	125500	128000	130000	132500	135500	138000
95	40000	60000	80000	100000	120000	124500	126500	128500	131000	133000	136000	138500
96	40000	60000	80000	100000	120000	125000	127000	129000	131500	134000	136500	139000
97	40000	60000	80000	100000	120000	125500	127500	129500	132000	134500	137000	139500
98	40000	60000	80000	100000	120000	126000	128000	130000	132500	135000	137500	140000
99	40000	60000	80000	100000	120000	126500	128500	130500	133000	135500	138000	140500
100	40000	60000	80000	100000	120000	127500	129000	131000	133500	136000	138500	141000
101	40000	60000	80000	100000	120000	128000	129500	132000	134000	136500	139000	141500
102	40000	60000	80000	100000	120000	128500	130500	132500	134500	137000	139500	142000
103	40000	60000	80000	100000	120000	129000	131000	133000	135000	137500	140000	143000
104	40000	60000	80000	100000	120000	129500	131500	133500	136000	138000	140500	143500
105	40000	60000	80000	100000	120000	130000	132000	134000	136500	138500	141500	144000
106	40000	60000	80000	100000	120000	131000	132500	134500	137000	139500	142000	144500
107	40000	60000	80000	100000	120000	131500	133000	135000	137500	140000	142500	145000
108	40000	60000	80000	100000	120000	132000	133500	135500	138000	140500	143000	145500
109	40000	60000	80000	100000	120000	132500	134500	136500	138500	141000	143500	146000
110	40000	60000	80000	100000	120000	133000	135000	137000	139000	141500	144000	146500

Table E-4 Maximum Gross Weight using Modified Formula with C4 = 48

	c4 =	33	(5%)		Number of Axles							
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing			Difference Between Current BGWF and Proposed BGWF - Pounds									
9	1000	6000										
10	0	6000	3000									
11	0	6000	3000									
12	0	6000	3000									
13	0	6000	3000									
14	0	6000	3000	0								
15	0	6000	3000	0								
16	0	6000	3000	0								
17	0	6000	3000	0	-3000							
18	0	6000	3000	0	-3000							
19	0	6000	3000	0	-3000							
20	0	6000	3000	0	-3000	-6000						
21	0	6000	3000	0	-3000	-6000						
22	0	6000	3000	0	-3000	-6000						
23	0	6000	3000	0	-3000	-6000						
24	0	6000	3000	0	-3000	-6000	-9000					
25	0	5500	3000	0	-3000	-6000	-9000					
26	0	4500	3000	0	-3000	-6000	-9000					
27	0	4000	3000	0	-3000	-6000	-9000	-12000				
28	0	3000	3000	0	-3000	-6000	-9000	-12000				
29	0	2500	3000	0	-3000	-6000	-9000	-12000				
30	0	1500	3000	0	-3000	-6000	-9000	-12000	-15000			
31	0	1000	3000	0	-3000	-6000	-9000	-12000	-15000			
32	0	0	3000	0	-3000	-6000	-9000	-12000	-15000			
33	0	0	3000	0	-3000	-6000	-9000	-12000	-15000			
34	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000		
35	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000		
36	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000		
37	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	
38	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	
39	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	
40	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
41	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
42	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
43	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
44	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
45	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
46	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
47	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
48	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
49	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
50	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
51	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
52	0	0	3000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
53	0	0	2500	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
54	0	0	2000	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
55	0	0	1500	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
56	0	0	500	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
57	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
58	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
59	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
60	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
61	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
62	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
63	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
64	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000

	c4 =	33	(5%)		Number of Axles							
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing			Difference Between Current BGWF and Proposed BGWF - Pounds									
65	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
66	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
67	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
68	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
69	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
70	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
71	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
72	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
73	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
74	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
75	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
76	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
77	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
78	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
79	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
80	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
81	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
82	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
83	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
84	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
85	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
86	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
87	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
88	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
89	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
90	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
91	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
92	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
93	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
94	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
95	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
96	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
97	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
98	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
99	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
100	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
101	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
102	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
103	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
104	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
105	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
106	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
107	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
108	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
109	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000
110	0	0	0	0	-3000	-6000	-9000	-12000	-15000	-18000	-21000	-24000

Table E-5 Difference Between Current BGWF and Modified Formula with C4 = 33

	c4 =	33	(5%)		Number of Axles							
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing				Maximum Gross Weight - Pounds								
9	40000	48500										
10	40000	49500	51500									
11	40000	50000	52500									
12	40000	51000	53000									
13	40000	51500	53500									
14	40000	52500	54500	56500								
15	40000	53000	55000	57500								
16	40000	54000	55500	58000								
17	40000	54500	56500	58500	61000							
18	40000	55500	57000	59000	62000							
19	40000	56000	57500	60000	62500							
20	40000	57000	58500	60500	63000	65500						
21	40000	57500	59000	61000	63500	66000						
22	40000	58500	59500	61500	64000	67000						
23	40000	59000	60500	62500	65000	67500						
24	40000	60000	61000	63000	65500	68000	70500					
25	40000	60000	61500	63500	66000	68500	71500					
26	40000	60000	62500	64000	66500	69000	72000					
27	40000	60000	63000	65000	67000	69500	72500	75000				
28	40000	60000	63500	65500	68000	70500	73000	75500				
29	40000	60000	64500	66000	68500	71000	73500	76500				
30	40000	60000	65000	66500	69000	71500	74000	77000	79500			
31	40000	60000	65500	67500	69500	72000	74500	77500	80000			
32	40000	60000	66500	68000	70000	72500	75500	78000	81000			
33	40000	60000	67000	68500	71000	73000	76000	78500	81500			
34	40000	60000	67500	69000	71500	74000	76500	79000	82000	84500		
35	40000	60000	68500	70000	72000	74500	77000	79500	82500	85000		
36	40000	60000	69000	70500	72500	75000	77500	80000	83000	86000		
37	40000	60000	69500	71000	73000	75500	78000	81000	83500	86500	89000	
38	40000	60000	70500	71500	74000	76000	78500	81500	84000	87000	89500	
39	40000	60000	71000	72500	74500	76500	79500	82000	84500	87500	90500	
40	40000	60000	71500	73000	75000	77500	80000	82500	85000	88000	91000	93500
41	40000	60000	72500	73500	75500	78000	80500	83000	86000	88500	91500	94000
42	40000	60000	73000	74000	76000	78500	81000	83500	86500	89000	92000	94500
43	40000	60000	73500	75000	77000	79000	81500	84000	87000	89500	92500	95500
44	40000	60000	74500	75500	77500	79500	82000	84500	87500	90000	93000	96000
45	40000	60000	75000	76000	78000	80000	82500	85500	88000	90500	93500	96500
46	40000	60000	75500	76500	78500	81000	83500	86000	88500	91500	94000	97000
47	40000	60000	76500	77500	79000	81500	84000	86500	89000	92000	94500	97500
48	40000	60000	77000	78000	80000	82000	84500	87000	89500	92500	95000	98000
49	40000	60000	77500	78500	80500	82500	85000	87500	90000	93000	95500	98500
50	40000	60000	78500	79000	81000	83000	85500	88000	91000	93500	96500	99000
51	40000	60000	79000	80000	81500	83500	86000	88500	91500	94000	97000	99500
52	40000	60000	79500	80500	82000	84500	86500	89000	92000	94500	97500	100000
53	40000	60000	80000	81000	83000	85000	87500	90000	92500	95000	98000	100500
54	40000	60000	80000	81500	83500	85500	88000	90500	93000	95500	98500	101000
55	40000	60000	80000	82500	84000	86000	88500	91000	93500	96000	99000	102000
56	40000	60000	80000	83000	84500	86500	89000	91500	94000	97000	99500	102500
57	40000	60000	80000	83500	85000	87000	89500	92000	94500	97500	100000	103000
58	40000	60000	80000	84000	86000	88000	90000	92500	95000	98000	100500	103500
59	40000	60000	80000	85000	86500	88500	90500	93000	96000	98500	101000	104000
60	40000	60000	80000	85500	87000	89000	91500	93500	96500	99000	101500	104500
61	40000	60000	80000	86000	87500	89500	92000	94500	97000	99500	102500	105000
62	40000	60000	80000	86500	88000	90000	92500	95000	97500	100000	103000	105500
63	40000	60000	80000	87500	89000	90500	93000	95500	98000	100500	103500	106000
64	40000	60000	80000	88000	89500	91500	93500	96000	98500	101000	104000	106500

	c4 =	33	(5%)			Number of Axles						
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing				Maximum Gross Weight - Pounds								
65	40000	60000	80000	88500	90000	92000	94000	96500	99000	101500	104500	107000
66	40000	60000	80000	89000	90500	92500	94500	97000	99500	102500	105000	107500
67	40000	60000	80000	90000	91000	93000	95500	97500	100000	103000	105500	108500
68	40000	60000	80000	90500	92000	93500	96000	98000	101000	103500	106000	109000
69	40000	60000	80000	91000	92500	94000	96500	99000	101500	104000	106500	109500
70	40000	60000	80000	91500	93000	95000	97000	99500	102000	104500	107000	110000
71	40000	60000	80000	92500	93500	95500	97500	100000	102500	105000	107500	110500
72	40000	60000	80000	93000	94000	96000	98000	100500	103000	105500	108500	111000
73	40000	60000	80000	93500	95000	96500	98500	101000	103500	106000	109000	111500
74	40000	60000	80000	94000	95500	97000	99500	101500	104000	106500	109500	112000
75	40000	60000	80000	95000	96000	97500	100000	102000	104500	107000	110000	112500
76	40000	60000	80000	95500	96500	98500	100500	102500	105000	108000	110500	113000
77	40000	60000	80000	96000	97000	99000	101000	103500	106000	108500	111000	113500
78	40000	60000	80000	96500	98000	99500	101500	104000	106500	109000	111500	114000
79	40000	60000	80000	97500	98500	100000	102000	104500	107000	109500	112000	115000
80	40000	60000	80000	98000	99000	100500	102500	105000	107500	110000	112500	115500
81	40000	60000	80000	98500	99500	101000	103500	105500	108000	110500	113000	116000
82	40000	60000	80000	99000	100000	102000	104000	106000	108500	111000	113500	116500
83	40000	60000	80000	100000	101000	102500	104500	106500	109000	111500	114500	117000
84	40000	60000	80000	100000	101500	103000	105000	107000	109500	112000	115000	117500
85	40000	60000	80000	100000	102000	103500	105500	108000	110000	112500	115500	118000
86	40000	60000	80000	100000	102500	104000	106000	108500	111000	113500	116000	118500
87	40000	60000	80000	100000	103000	104500	106500	109000	111500	114000	116500	119000
88	40000	60000	80000	100000	104000	105500	107500	109500	112000	114500	117000	119500
89	40000	60000	80000	100000	104500	106000	108000	110000	112500	115000	117500	120000
90	40000	60000	80000	100000	105000	106500	108500	110500	113000	115500	118000	120500
91	40000	60000	80000	100000	105500	107000	109000	111000	113500	116000	118500	121500
92	40000	60000	80000	100000	106000	107500	109500	111500	114000	116500	119000	122000
93	40000	60000	80000	100000	107000	108000	110000	112500	114500	117000	119500	122500
94	40000	60000	80000	100000	107500	109000	110500	113000	115000	117500	120500	123000
95	40000	60000	80000	100000	108000	109500	111500	113500	116000	118000	121000	123500
96	40000	60000	80000	100000	108500	110000	112000	114000	116500	119000	121500	124000
97	40000	60000	80000	100000	109000	110500	112500	114500	117000	119500	122000	124500
98	40000	60000	80000	100000	110000	111000	113000	115000	117500	120000	122500	125000
99	40000	60000	80000	100000	110500	111500	113500	115500	118000	120500	123000	125500
100	40000	60000	80000	100000	111000	112500	114000	116000	118500	121000	123500	126000
101	40000	60000	80000	100000	111500	113000	114500	117000	119000	121500	124000	126500
102	40000	60000	80000	100000	112000	113500	115500	117500	119500	122000	124500	127000
103	40000	60000	80000	100000	113000	114000	116000	118000	120000	122500	125000	128000
104	40000	60000	80000	100000	113500	114500	116500	118500	121000	123000	125500	128500
105	40000	60000	80000	100000	114000	115000	117000	119000	121500	123500	126500	129000
106	40000	60000	80000	100000	114500	116000	117500	119500	122000	124500	127000	129500
107	40000	60000	80000	100000	115000	116500	118000	120000	122500	125000	127500	130000
108	40000	60000	80000	100000	116000	117000	118500	120500	123000	125500	128000	130500
109	40000	60000	80000	100000	116500	117500	119500	121500	123500	126000	128500	131000
110	40000	60000	80000	100000	117000	118000	120000	122000	124000	126500	129000	131500

Table E-6 Maximum Gross Weight using Modified Formula with C4 = 33

	c4 =	21	(2%)	Number of Axles								
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing	Difference Between Current BGWF and Proposed BGWF - Pounds											
9	-3000	-6000										
10	-3000	-6000	-9000									
11	-2000	-6000	-9000									
12	-1000	-6000	-9000									
13	0	-6000	-9000									
14	0	-6000	-9000	-12000								
15	0	-6000	-9000	-12000								
16	0	-6000	-9000	-12000								
17	0	-6000	-9000	-12000	-15000							
18	0	-6000	-9000	-12000	-15000							
19	0	-6000	-9000	-12000	-15000							
20	0	-6000	-9000	-12000	-15000	-18000						
21	0	-6000	-9000	-12000	-15000	-18000						
22	0	-6000	-9000	-12000	-15000	-18000						
23	0	-6000	-9000	-12000	-15000	-18000						
24	0	-6000	-9000	-12000	-15000	-18000	-21000					
25	0	-6000	-9000	-12000	-15000	-18000	-21000					
26	0	-6000	-9000	-12000	-15000	-18000	-21000					
27	0	-6000	-9000	-12000	-15000	-18000	-21000	-24000				
28	0	-6000	-9000	-12000	-15000	-18000	-21000	-24000				
29	0	-6000	-9000	-12000	-15000	-18000	-21000	-24000				
30	0	-6000	-9000	-12000	-15000	-18000	-21000	-24000	-27000			
31	0	-6000	-9000	-12000	-15000	-18000	-21000	-24000	-27000			
32	0	-6000	-9000	-12000	-15000	-18000	-21000	-24000	-27000			
33	0	-5500	-9000	-12000	-15000	-18000	-21000	-24000	-27000			
34	0	-4500	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000		
35	0	-4000	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000		
36	0	-3000	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000		
37	0	-2500	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	
38	0	-1500	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	
39	0	-1000	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	
40	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
41	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
42	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
43	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
44	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
45	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
46	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
47	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
48	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
49	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
50	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
51	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
52	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
53	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
54	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
55	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
56	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
57	0	0	-9000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
58	0	0	-8500	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
59	0	0	-7500	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
60	0	0	-7000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
61	0	0	-6500	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
62	0	0	-5500	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
63	0	0	-5000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
64	0	0	-4500	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000

	c4 =	21	(2%)	Number of Axles								
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing	Difference Between Current BGWF and Proposed BGWF - Pounds											
65	0	0	-3500	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
66	0	0	-3000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
67	0	0	-2500	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
68	0	0	-1500	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
69	0	0	-1000	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
70	0	0	-500	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
71	0	0	0	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
72	0	0	0	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
73	0	0	0	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
74	0	0	0	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
75	0	0	0	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
76	0	0	0	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
77	0	0	0	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
78	0	0	0	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
79	0	0	0	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
80	0	0	0	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
81	0	0	0	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
82	0	0	0	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
83	0	0	0	-12000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
84	0	0	0	-11500	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
85	0	0	0	-11000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
86	0	0	0	-10500	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
87	0	0	0	-9500	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
88	0	0	0	-9000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
89	0	0	0	-8500	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
90	0	0	0	-8000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
91	0	0	0	-7000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
92	0	0	0	-6500	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
93	0	0	0	-6000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
94	0	0	0	-5500	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
95	0	0	0	-4500	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
96	0	0	0	-4000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
97	0	0	0	-3500	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
98	0	0	0	-3000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
99	0	0	0	-2000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
100	0	0	0	-1500	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
101	0	0	0	-1000	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
102	0	0	0	-500	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
103	0	0	0	0	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
104	0	0	0	0	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
105	0	0	0	0	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
106	0	0	0	0	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
107	0	0	0	0	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
108	0	0	0	0	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
109	0	0	0	0	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000
110	0	0	0	0	-15000	-18000	-21000	-24000	-27000	-30000	-33000	-36000

Table E-7 Difference Between Current BGWF and Modified Formula with C4 = 21

	c4 =	21	(2%)	Number of Axles								
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing	Maximum Gross Weight - Pounds											
9	36000	36500										
10	37000	37500	39500									
11	38000	38000	40500									
12	39000	39000	41000									
13	40000	39500	41500									
14	40000	40500	42500	44500								
15	40000	41000	43000	45500								
16	40000	42000	43500	46000								
17	40000	42500	44500	46500	49000							
18	40000	43500	45000	47000	50000							
19	40000	44000	45500	48000	50500							
20	40000	45000	46500	48500	51000	53500						
21	40000	45500	47000	49000	51500	54000						
22	40000	46500	47500	49500	52000	55000						
23	40000	47000	48500	50500	53000	55500						
24	40000	48000	49000	51000	53500	56000	58500					
25	40000	48500	49500	51500	54000	56500	59500					
26	40000	49500	50500	52000	54500	57000	60000					
27	40000	50000	51000	53000	55000	57500	60500	63000				
28	40000	51000	51500	53500	56000	58500	61000	63500				
29	40000	51500	52500	54000	56500	59000	61500	64500				
30	40000	52500	53000	54500	57000	59500	62000	65000	67500			
31	40000	53000	53500	55500	57500	60000	62500	65500	68000			
32	40000	54000	54500	56000	58000	60500	63500	66000	69000			
33	40000	54500	55000	56500	59000	61000	64000	66500	69500			
34	40000	55500	55500	57000	59500	62000	64500	67000	70000	72500		
35	40000	56000	56500	58000	60000	62500	65000	67500	70500	73000		
36	40000	57000	57000	58500	60500	63000	65500	68000	71000	74000		
37	40000	57500	57500	59000	61000	63500	66000	69000	71500	74500	77000	
38	40000	58500	58500	59500	62000	64000	66500	69500	72000	75000	77500	
39	40000	59000	59000	60500	62500	64500	67500	70000	72500	75500	78500	
40	40000	60000	59500	61000	63000	65500	68000	70500	73000	76000	79000	81500
41	40000	60000	60500	61500	63500	66000	68500	71000	74000	76500	79500	82000
42	40000	60000	61000	62000	64000	66500	69000	71500	74500	77000	80000	82500
43	40000	60000	61500	63000	65000	67000	69500	72000	75000	77500	80500	83500
44	40000	60000	62500	63500	65500	67500	70000	72500	75500	78000	81000	84000
45	40000	60000	63000	64000	66000	68000	70500	73500	76000	78500	81500	84500
46	40000	60000	63500	64500	66500	69000	71500	74000	76500	79500	82000	85000
47	40000	60000	64500	65500	67000	69500	72000	74500	77000	80000	82500	85500
48	40000	60000	65000	66000	68000	70000	72500	75000	77500	80500	83000	86000
49	40000	60000	65500	66500	68500	70500	73000	75500	78000	81000	83500	86500
50	40000	60000	66500	67000	69000	71000	73500	76000	79000	81500	84500	87000
51	40000	60000	67000	68000	69500	71500	74000	76500	79500	82000	85000	87500
52	40000	60000	67500	68500	70000	72500	74500	77000	80000	82500	85500	88000
53	40000	60000	68500	69000	71000	73000	75500	78000	80500	83000	86000	88500
54	40000	60000	69000	69500	71500	73500	76000	78500	81000	83500	86500	89000
55	40000	60000	69500	70500	72000	74000	76500	79000	81500	84000	87000	90000
56	40000	60000	70500	71000	72500	74500	77000	79500	82000	85000	87500	90500
57	40000	60000	71000	71500	73000	75000	77500	80000	82500	85500	88000	91000
58	40000	60000	71500	72000	74000	76000	78000	80500	83000	86000	88500	91500
59	40000	60000	72500	73000	74500	76500	78500	81000	84000	86500	89000	92000
60	40000	60000	73000	73500	75000	77000	79500	81500	84500	87000	89500	92500
61	40000	60000	73500	74000	75500	77500	80000	82500	85000	87500	90500	93000
62	40000	60000	74500	74500	76000	78000	80500	83000	85500	88000	91000	93500
63	40000	60000	75000	75500	77000	78500	81000	83500	86000	88500	91500	94000
64	40000	60000	75500	76000	77500	79500	81500	84000	86500	89000	92000	94500

	c4 =	21	(2%)	Number of Axles								
Axle	2	3	4	5	6	7	8	9	10	11	12	13
Spacing	Maximum Gross Weight - Pounds											
65	40000	60000	76500	76500	78000	80000	82000	84500	87000	89500	92500	95000
66	40000	60000	77000	77000	78500	80500	82500	85000	87500	90500	93000	95500
67	40000	60000	77500	78000	79000	81000	83500	85500	88000	91000	93500	96500
68	40000	60000	78500	78500	80000	81500	84000	86000	89000	91500	94000	97000
69	40000	60000	79000	79000	80500	82000	84500	87000	89500	92000	94500	97500
70	40000	60000	79500	79500	81000	83000	85000	87500	90000	92500	95000	98000
71	40000	60000	80000	80500	81500	83500	85500	88000	90500	93000	95500	98500
72	40000	60000	80000	81000	82000	84000	86000	88500	91000	93500	96500	99000
73	40000	60000	80000	81500	83000	84500	86500	89000	91500	94000	97000	99500
74	40000	60000	80000	82000	83500	85000	87500	89500	92000	94500	97500	100000
75	40000	60000	80000	83000	84000	85500	88000	90000	92500	95000	98000	100500
76	40000	60000	80000	83500	84500	86500	88500	90500	93000	96000	98500	101000
77	40000	60000	80000	84000	85000	87000	89000	91500	94000	96500	99000	101500
78	40000	60000	80000	84500	86000	87500	89500	92000	94500	97000	99500	102000
79	40000	60000	80000	85500	86500	88000	90000	92500	95000	97500	100000	103000
80	40000	60000	80000	86000	87000	88500	90500	93000	95500	98000	100500	103500
81	40000	60000	80000	86500	87500	89000	91500	93500	96000	98500	101000	104000
82	40000	60000	80000	87000	88000	90000	92000	94000	96500	99000	101500	104500
83	40000	60000	80000	88000	89000	90500	92500	94500	97000	99500	102500	105000
84	40000	60000	80000	88500	89500	91000	93000	95000	97500	100000	103000	105500
85	40000	60000	80000	89000	90000	91500	93500	96000	98000	100500	103500	106000
86	40000	60000	80000	89500	90500	92000	94000	96500	99000	101500	104000	106500
87	40000	60000	80000	90500	91000	92500	94500	97000	99500	102000	104500	107000
88	40000	60000	80000	91000	92000	93500	95500	97500	100000	102500	105000	107500
89	40000	60000	80000	91500	92500	94000	96000	98000	100500	103000	105500	108000
90	40000	60000	80000	92000	93000	94500	96500	98500	101000	103500	106000	108500
91	40000	60000	80000	93000	93500	95000	97000	99000	101500	104000	106500	109500
92	40000	60000	80000	93500	94000	95500	97500	99500	102000	104500	107000	110000
93	40000	60000	80000	94000	95000	96000	98000	100500	102500	105000	107500	110500
94	40000	60000	80000	94500	95500	97000	98500	101000	103000	105500	108500	111000
95	40000	60000	80000	95500	96000	97500	99500	101500	104000	106000	109000	111500
96	40000	60000	80000	96000	96500	98000	100000	102000	104500	107000	109500	112000
97	40000	60000	80000	96500	97000	98500	100500	102500	105000	107500	110000	112500
98	40000	60000	80000	97000	98000	99000	101000	103000	105500	108000	110500	113000
99	40000	60000	80000	98000	98500	99500	101500	103500	106000	108500	111000	113500
100	40000	60000	80000	98500	99000	100500	102000	104000	106500	109000	111500	114000
101	40000	60000	80000	99000	99500	101000	102500	105000	107000	109500	112000	114500
102	40000	60000	80000	99500	100000	101500	103500	105500	107500	110000	112500	115000
103	40000	60000	80000	100000	101000	102000	104000	106000	108000	110500	113000	116000
104	40000	60000	80000	100000	101500	102500	104500	106500	109000	111000	113500	116500
105	40000	60000	80000	100000	102000	103000	105000	107000	109500	111500	114500	117000
106	40000	60000	80000	100000	102500	104000	105500	107500	110000	112500	115000	117500
107	40000	60000	80000	100000	103000	104500	106000	108000	110500	113000	115500	118000
108	40000	60000	80000	100000	104000	105000	106500	108500	111000	113500	116000	118500
109	40000	60000	80000	100000	104500	105500	107500	109500	111500	114000	116500	119000
110	40000	60000	80000	100000	105000	106000	108000	110000	112000	114500	117000	119500

Table E-8 Maximum Gross Weight using Modified Formula with C4 = 21