Comparison of Proposed Required Wind Bracing Amounts
To Historic Required Wind Bracing Amounts

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Objective
To compare proposed engineering based required amounts of wall bracing for wind to historically required amounts of wall bracing for wind.

Overview
This summary is divided into three parts as follows:

1) Summarize historically required amounts of wall bracing
2) Compare RB 148-07/08 to historically required amounts of wall bracing
3) Compare a proposed change to RB 148-07/08 to historically required amounts of wall bracing

1 – Summary of historically required amounts of wall bracing

1927-1999 Historic Requirements

The APA archives contains copies of historic model building codes dating back more than 50 years. The following codes and editions were examined:

- Uniform Building Code (UBC), 1927 to 1997 editions.
- Basic Building Code (BOCA), 1950 to 1999 editions.
- Southern Standard Building Code (SBC), 1946 to 1999 editions.
- One and Two Family Dwelling Code (OTFDC), 1971 edition to 1998 editions.

Without going into great details, the early editions of each of these model codes generally required bracing at corners. The 1970 UBC, Section 2518, required all exterior walls to be: "*effectively and thoroughly braced at each end, or as near thereto as possible, and at least every 25 feet of length".*

The 1950-1996 BOCA code prescribed how corners were to be constructed and braced but never had a requirement for 'and every 25-ft o.c.'. The 1999 BOCA edition required the wall to be "designed for the wind loads" or to use the Wood Frame Construction manual (and engineering based document).

The 1946 SBC code prescribed how corners were to be constructed and braced but it was not until the 1991 edition that both corners 'and at least every 25-ft o.c.' was made explicit and remained in the 1999 edition.

The OTFDC code required just corner bracing until the 1989 edition when the 'and at least every 25-ft o.c.' was added and remained in the 1998 edition.

For purposes of simple comparison, the "1950-1999" historic required amounts of wall bracing will be taken as: ***at each end, or as near thereto as possible, and at least every 25 feet o.c.***. A graphic example of this requirement can be seen in Figure 1.

2000-2006 IRC Requirements

The 2000-2006 International Residential Code (IRC) added complexity to the '*at each end, or as near thereto as possible, and at least every 25 feet o.c.*' by also requiring that bracing not be less than a certain percentage (16% in many cases) and permitting bracing to start 12.5-ft from the end. ICC has issued formal interpretations (on the 2003 IRC) all saying that one bracing panel is all that is needed in a 25-ft long wall as long as the minimum percentage was met because that one panel is also within 12.5-ft from each end. A graphic example of the minimum 2006 IRC panel placement requirements can be seen in Figure 2. For simplicity, let-in braces are omitted in these comparisons but results are similar.

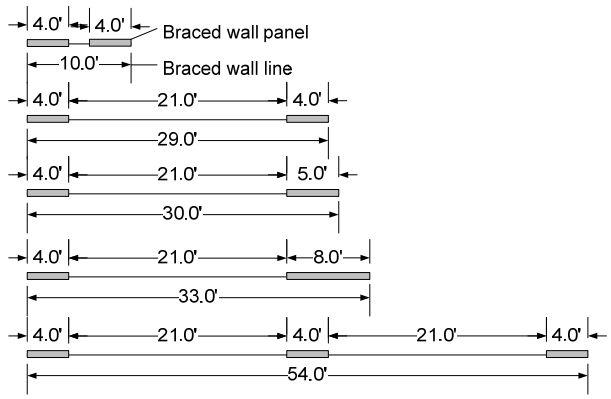

Figure 1. Graphic representation of general historical minimum amount of bracing required on given braced wall line.

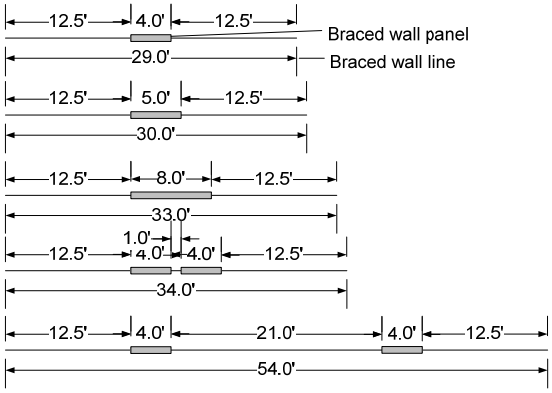

Figure 2. Graphic representation of IRC minimum amount of bracing required on given braced wall line due to panel placement. Note: the 16% minimum would require an extra 0.64-ft of panel on the 54-ft long braced wall line.

Comparing Historic Requirements to IRC

The provision that allows bracing to be placed 12.5-ft from the end combined with the 16% minimum is why the 2000-2006 IRC allows less bracing than the historic conventional construction model codes. The historical requirement for bracing 'at corners', and/or 'at each end' implies a minimum requirement of 2 braced wall panels in a wall line. The requirements for starting a BWP at the actual end "or near thereto as possible" and every 25-ft o.c. leads to a significantly greater amount of bracing compared to the IRC.

Table 1 summarizes the minimum amount of bracing per general 1950-1999 historic requirements (for simplicity, let-in is omitted) and Table 2 summarizes the minimum amount of bracing per the IRC (for simplicity, let-in is omitted), and Table 3 summarizes a comparison. Note the following abbreviations are used:

- **BWL = Braced wall line**
- **BWP = Braced wall panel**

Table 1. The minimum amount of bracing per general historic requirements

1950-1999 Historic						
	"1:1" diaphragm aspect ratio					
			100 mph (?) and less			
				Expressed in Feet		
Method	BWL Spacing (ft)	BWL Length (ft)	Based on spacing[1] (ft)	 (ft)	 (ft)	 (ft)
2	10	10	8	8.0	8.0	8.0
	20	20	8	8.0	8.0	8.0
	30	30	9	9.0	9.0	9.0
	40	40	12	12.0	12.0	12.0
	50	50	12	12.0	12.0	12.0
3	10	10	8	8.0	8.0	8.0
	20	20	8	8.0	8.0	8.0
	30	30	9	9.0	9.0	9.0
	40	40	12	12.0	12.0	12.0
	50	50	12	12.0	12.0	12.0
4	10	10	8	8.0	8.0	8.0
	20	20	8	8.0	8.0	8.0
	30	30	9	9.0	9.0	9.0
	40	40	12	12.0	12.0	12.0
	50	50	12	12.0	12.0	12.0
5	10	10	8	8.0	8.0	8.0
	20	20	8	8.0	8.0	8.0
	30	30	9	9.0	9.0	9.0
	40	40	12	12.0	12.0	12.0
	50	50	12	12.0	12.0	12.0
6	10	10	8	8.0	8.0	8.0
	20	20	8	8.0	8.0	8.0
	30	30	9	9.0	9.0	9.0
	40	40	12	12.0	12.0	12.0
	50	50	12	12.0	12.0	12.0
7	10	10	8	8.0	8.0	8.0
	20	20	8	8.0	8.0	8.0
	30	30	9	9.0	9.0	9.0
	40	40	12	12.0	12.0	12.0
	50	50	12	12.0	12.0	12.0
8	10	10	8	8.0	8.0	8.0
	20	20	8	8.0	8.0	8.0
	30	30	9	9.0	9.0	9.0
	40	40	12	12.0	12.0	12.0
	50	50	12	12.0	12.0	12.0

1. The following summarizes the absolute minimum amount of bracing required. 21-ft clear distance between BWP's is also assumed for simplicity.

	BWL Length	Amount
All methods except let-in	0	8
	29	8
	30	9
	31	10
	32	11
	33	12
	54	12

Table 2. The minimum amount of bracing per the IRC

2006 IRC									
	"1:1" diaphragm aspect ratio[1,2,3]								
			Amount of Bracing Requird for 100 MPH or less						
			Expressed in Percent			Amount BWP (ft) Based on Spacing[3]	Expressed in Feet[3]		
Method	BWL Spacing (ft)	BWL Length (ft)	%	%	%		(ft)	(ft)	(ft)
2	10	10	16	25	35	4	4.0	4.0	4.0
	20	20	16	25	35	4	4.0	5.0	7.0
	30	30	16	25	35	5	5.0	7.5	10.5
	40	40	18.3	28.6	40.0	8	8.0	11.4	16.0
	50	50	22.9	35.7	50.0	8	11.4	17.9	25.0
3	10	10	16	16	25	4	4.0	4.0	4.0
	20	20	16	16	25	4	4.0	4.0	5.0
	30	30	16	16	25	5	5.0	5.0	7.5
	40	40	18.3	18.3	28.6	8	8.0	8.0	11.4
	50	50	22.9	22.9	35.7	8	11.4	11.4	17.9
4	10	10	16	25	35	4	4.0	4.0	4.0
	20	20	16	25	35	4	4.0	5.0	7.0
	30	30	16	25	35	5	5.0	7.5	10.5
	40	40	18.3	28.6	40.0	8	8.0	11.4	16.0
	50	50	22.9	35.7	50.0	8	11.4	17.9	25.0
5	10	10	16	25	35	4	4.0	4.0	4.0
	20	20	16	25	35	4	4.0	5.0	7.0
	30	30	16	25	35	5	5.0	7.5	10.5
	40	40	18.3	28.6	40.0	8	8.0	11.4	16.0
	50	50	22.9	35.7	50.0	8	11.4	17.9	25.0
6	10	10	16	25	35	4	4.0	4.0	4.0
	20	20	16	25	35	4	4.0	5.0	7.0
	30	30	16	25	35	5	5.0	7.5	10.5
	40	40	18.3	28.6	40.0	8	8.0	11.4	16.0
	50	50	22.9	35.7	50.0	8	11.4	17.9	25.0
7	10	10	16	25	35	4	4.0	4.0	4.0
	20	20	16	25	35	4	4.0	5.0	7.0
	30	30	16	25	35	5	5.0	7.5	10.5
	40	40	18.3	28.6	40.0	8	8.0	11.4	16.0
	50	50	22.9	35.7	50.0	8	11.4	17.9	25.0
8	10	10	16	25	35	4	4.0	4.0	4.0
	20	20	16	25	35	4	4.0	5.0	7.0
	30	30	16	25	35	5	5.0	7.5	10.5
	40	40	18.3	28.6	40.0	8	8.0	11.4	16.0
	50	50	22.9	35.7	50.0	8	11.4	17.9	25.0

1. BWL = Braced wall line, BWP = Braced Wall Panel
2. In order to convert % to a specified length, both the BWL spacing and BWL length must be known.
3. In addition to the minimum %, the following summarizes the absolute minimum number of BWP's required assuming panels are inset 12.5 from end of BWL:

	BWL Length (ft)	Amount (ft)
All methods except let-in	0	4
	29	4
	30	5
	31	6
	32	7
	33	8
	54	8

Table 3. A comparison between 2000-2006 IRC and 1950-1999 historic amounts of bracing required

Compare historic bracing amounts to IRC				
	difference = (historic/IRC)-1			
		100 MPH (?)		
		% increase or decrease		
	BWL Spacing			
Method	(ft)	(ft)	(ft)	(ft)
2, 4-8	10	100%	100%	100%
	20	100%	60%	14%
	30	80%	20%	-14%
	40	50%	5%	-25%
	50	5%	-33%	-52%
3	10	100%	100%	100%
	20	100%	100%	60%
	30	80%	80%	20%
	40	50%	50%	5%
	50	5%	5%	-33%

As seen in Table 3 and Figures 1 and 2, the 2000-2006 IRC requires significantly less bracing than has generally been required by model codes from 1950-1999.

2 - Comparison of RB 148-07/08 to historically required amounts of wall bracing

The amount bracing required per code change proposal RB 148-07/08 is as follows in Table 4. A comparison between the RB148-07/08 proposal and the 2006 IRC amounts is shown in Table 5. A comparison between the RB148-07/08 proposal and the 1950 to 1999 Historic amounts is shown in Table 6.

Table 4. Amount bracing required per code change proposal RB 148-07/08

Proposed in RB148-07/08										
	Amount of bracing required for 1:1 aspect ratio building									
		85 MPH			90 MPH			100 MPH		
		Expressed in Feet			Expressed in Feet			Expressed in Feet		
	BWL Spacing									
Method	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
2	10	3.9	5.4	6.2	4.4	6.0	6.9	5.4	7.4	8.5
	20	7.3	10.0	11.5	8.2	11.3	12.9	10.2	13.9	16.0
	30	10.6	14.5	16.6	11.9	16.2	18.6	14.7	20.1	23.0
	40	13.8	18.9	21.7	15.5	21.2	24.3	19.1	26.1	30.0
	50	17.0	23.2	26.7	19.0	26.0	29.9	23.5	32.1	36.9
3	10	3.9	5.4	6.2	4.4	6.0	6.9	5.4	7.4	8.5
	20	7.3	10.0	11.5	8.2	11.3	12.9	10.2	13.9	16.0
	30	10.6	14.5	16.6	11.9	16.2	18.6	14.7	20.1	23.0
	40	13.8	18.9	21.7	15.5	21.2	24.3	19.1	26.1	30.0
	50	17.0	23.2	26.7	19.0	26.0	29.9	23.5	32.1	36.9
4	10	3.9	5.4	6.2	4.4	6.0	6.9	5.4	7.4	8.5
	20	7.3	10.0	11.5	8.2	11.3	12.9	10.2	13.9	16.0
	30	10.6	14.5	16.6	11.9	16.2	18.6	14.7	20.1	23.0
	40	13.8	18.9	21.7	15.5	21.2	24.3	19.1	26.1	30.0
	50	17.0	23.2	26.7	19.0	26.0	29.9	23.5	32.1	36.9
5	10	6.9	9.4	10.8	7.7	10.5	12.1	9.5	13.0	14.9
	20	12.9	17.6	20.2	14.4	19.7	22.6	17.8	24.3	27.9
	30	18.5	25.4	29.1	20.8	28.4	32.6	25.7	35.1	40.3
	40	24.2	33.0	37.9	27.1	37.0	42.5	33.4	45.7	52.5
	50	29.7	40.6	46.7	33.3	45.6	52.3	41.1	56.3	64.6
6	10	3.9	5.4	6.2	4.4	6.0	6.9	5.4	7.4	8.5
	20	7.3	10.0	11.5	8.2	11.3	12.9	10.2	13.9	16.0
	30	10.6	14.5	16.6	11.9	16.2	18.6	14.7	20.1	23.0
	40	13.8	18.9	21.7	15.5	21.2	24.3	19.1	26.1	30.0
	50	17.0	23.2	26.7	19.0	26.0	29.9	23.5	32.1	36.9
7	10	3.9	5.4	6.2	4.4	6.0	6.9	5.4	7.4	8.5
	20	7.3	10.0	11.5	8.2	11.3	12.9	10.2	13.9	16.0
	30	10.6	14.5	16.6	11.9	16.2	18.6	14.7	20.1	23.0
	40	13.8	18.9	21.7	15.5	21.2	24.3	19.1	26.1	30.0
	50	17.0	23.2	26.7	19.0	26.0	29.9	23.5	32.1	36.9
8	10	3.9	5.4	6.2	4.4	6.0	6.9	5.4	7.4	8.5
	20	7.3	10.0	11.5	8.2	11.3	12.9	10.2	13.9	16.0
	30	10.6	14.5	16.6	11.9	16.2	18.6	14.7	20.1	23.0
	40	13.8	18.9	21.7	15.5	21.2	24.3	19.1	26.1	30.0
	50	17.0	23.2	26.7	19.0	26.0	29.9	23.5	32.1	36.9
Based on:				Resistance calibration factors:						
	10-ft roof ridge height				1.0 on restrained					
	10-ft floor to ceiling height				1.1 on unrestrained					

Table 5. Compare RB148-07/08 to 2006 IRC

Proposed RB148-07/08 compared to 2006 IRC (% increase or decrease)										
	difference = (proposed/IRC)-1									
		85 MPH			90 MPH			100 MPH		
		% increase or decrease			% increase or decrease			% increase or decrease		
	BWL Spacing									
Method	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
2	10	-2%	34%	54%	10%	51%	73%	36%	86%	113%
	20	84%	101%	65%	106%	125%	85%	154%	178%	128%
	30	112%	93%	58%	138%	117%	78%	193%	167%	119%
	40	73%	65%	35%	93%	85%	52%	139%	129%	87%
	50	49%	30%	7%	67%	46%	20%	106%	80%	48%
3	10	-2%	34%	54%	10%	51%	73%	36%	86%	113%
	20	84%	151%	131%	106%	182%	159%	154%	248%	219%
	30	112%	190%	122%	138%	225%	149%	193%	301%	207%
	40	73%	136%	89%	93%	164%	112%	139%	226%	162%
	50	49%	103%	49%	67%	128%	67%	106%	181%	107%
4	10	-2%	34%	54%	10%	51%	73%	36%	86%	113%
	20	84%	101%	65%	106%	125%	85%	154%	178%	128%
	30	112%	93%	58%	138%	117%	78%	193%	167%	119%
	40	73%	65%	35%	93%	85%	52%	139%	129%	87%
	50	49%	30%	7%	67%	46%	20%	106%	80%	48%
5	10	72%	135%	170%	93%	164%	202%	138%	225%	273%
	20	221%	252%	188%	260%	294%	223%	345%	387%	299%
	30	271%	238%	177%	316%	279%	211%	413%	368%	284%
	40	202%	189%	137%	238%	224%	166%	318%	300%	228%
	50	160%	128%	87%	192%	155%	109%	260%	215%	158%
6	10	-2%	34%	54%	10%	51%	73%	36%	86%	113%
	20	84%	101%	65%	106%	125%	85%	154%	178%	128%
	30	112%	93%	58%	138%	117%	78%	193%	167%	119%
	40	73%	65%	35%	93%	85%	52%	139%	129%	87%
	50	49%	30%	7%	67%	46%	20%	106%	80%	48%
7	10	-2%	34%	54%	10%	51%	73%	36%	86%	113%
	20	84%	101%	65%	106%	125%	85%	154%	178%	128%
	30	112%	93%	58%	138%	117%	78%	193%	167%	119%
	40	73%	65%	35%	93%	85%	52%	139%	129%	87%
	50	49%	30%	7%	67%	46%	20%	106%	80%	48%
8	10	-2%	34%	54%	10%	51%	73%	36%	86%	113%
	20	84%	101%	65%	106%	125%	85%	154%	178%	128%
	30	112%	93%	58%	138%	117%	78%	193%	167%	119%
	40	73%	65%	35%	93%	85%	52%	139%	129%	87%
	50	49%	30%	7%	67%	46%	20%	106%	80%	48%
overall average =		79%			101%			148%		
overall average excluding method 5 =		63%			83%			126%		

Table 6. Compare RB148-07/08 to 1950-1999 Historic

Proposed RB148-07/08 compared to Historic (% increase or decrease)										
	difference = (proposed/historic)-1									
		85 MPH			90 MPH			100 MPH		
		% increase or decrease			% increase or decrease			% increase or decrease		
	BWL Spacing									
Method	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
2	10	-51%	-33%	-23%	-45%	-25%	-14%	-32%	-7%	7%
	20	-8%	26%	44%	3%	41%	62%	27%	74%	99%
	30	18%	61%	85%	32%	80%	107%	63%	123%	156%
	40	15%	57%	80%	29%	76%	102%	59%	118%	150%
	50	42%	94%	122%	59%	117%	149%	96%	168%	207%
3	10	-51%	-33%	-23%	-45%	-25%	-14%	-32%	-7%	7%
	20	-8%	26%	44%	3%	41%	62%	27%	74%	99%
	30	18%	61%	85%	32%	80%	107%	63%	123%	156%
	40	15%	57%	80%	29%	76%	102%	59%	118%	150%
	50	42%	94%	122%	59%	117%	149%	96%	168%	207%
4	10	-51%	-33%	-23%	-45%	-25%	-14%	-32%	-7%	7%
	20	-8%	26%	44%	3%	41%	62%	27%	74%	99%
	30	18%	61%	85%	32%	80%	107%	63%	123%	156%
	40	15%	57%	80%	29%	76%	102%	59%	118%	150%
	50	42%	94%	122%	59%	117%	149%	96%	168%	207%
5	10	-14%	18%	35%	-4%	32%	51%	19%	63%	87%
	20	61%	120%	152%	80%	146%	183%	122%	204%	249%
	30	106%	182%	223%	131%	216%	262%	185%	290%	347%
	40	101%	175%	216%	126%	208%	254%	179%	281%	337%
	50	148%	239%	289%	178%	280%	336%	243%	369%	438%
6	10	-51%	-33%	-23%	-45%	-25%	-14%	-32%	-7%	7%
	20	-8%	26%	44%	3%	41%	62%	27%	74%	99%
	30	18%	61%	85%	32%	80%	107%	63%	123%	156%
	40	15%	57%	80%	29%	76%	102%	59%	118%	150%
	50	42%	94%	122%	59%	117%	149%	96%	168%	207%
7	10	-51%	-33%	-23%	-45%	-25%	-14%	-32%	-7%	7%
	20	-8%	26%	44%	3%	41%	62%	27%	74%	99%
	30	18%	61%	85%	32%	80%	107%	63%	123%	156%
	40	15%	57%	80%	29%	76%	102%	59%	118%	150%
	50	42%	94%	122%	59%	117%	149%	96%	168%	207%
8	10	-51%	-33%	-23%	-45%	-25%	-14%	-32%	-7%	7%
	20	-8%	26%	44%	3%	41%	62%	27%	74%	99%
	30	18%	61%	85%	32%	80%	107%	63%	123%	156%
	40	15%	57%	80%	29%	76%	102%	59%	118%	150%
	50	42%	94%	122%	59%	117%	149%	96%	168%	207%
overall average =		50%			68%			107%		
overall average excluding method 5 =		35%			52%			87%		

3 - Comparison of Modified RB 148-07/08 to historically required amounts of wall bracing

In this section, the bracing amounts in RB 148-07/08 are modified in accordance with discussions from the BSSC/Dolan meeting (September 2007). Specifically, a 1.3, 1.2, and 1.1 factor are applied to the resistance values for top story, middle story and first of three story conditions. Also, the table is generated for 8-ft story heights and 8-ft roof height.

The amount bracing required per modified code change proposal RB 148-07/08 is as follows in Table 7. A comparison between the modified RB148-07/08 proposal and the 2006 IRC amounts is shown in Table 8. A comparison between the modified RB148-07/08 proposal and the 1950 to 1999 historic amounts is shown in Table 9.

Table 7. Amount of bracing required per modified RB 148-07/08 code change proposal

Modified RB148-07/08										
	Amount									
		85 MPH			90 MPH			100 MPH		
		Expressed in Feet			Expressed in Feet			Expressed in Feet		
	BWL Spacing									
Method	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
2	10	2.7	3.8	4.6	3.0	4.3	5.1	3.7	5.3	6.3
	20	5.0	7.2	8.5	5.6	8.1	9.5	6.9	10.0	11.8
	30	7.2	10.4	12.3	8.0	11.6	13.8	9.9	14.4	17.0
	40	9.3	13.5	16.0	10.5	15.2	17.9	12.9	18.7	22.1
	50	11.5	16.6	19.7	12.9	18.7	22.1	15.9	23.0	27.2
3	10	2.7	3.8	4.6	3.0	4.3	5.1	3.7	5.3	6.3
	20	5.0	7.2	8.5	5.6	8.1	9.5	6.9	10.0	11.8
	30	7.2	10.4	12.3	8.0	11.6	13.8	9.9	14.4	17.0
	40	9.3	13.5	16.0	10.5	15.2	17.9	12.9	18.7	22.1
	50	11.5	16.6	19.7	12.9	18.7	22.1	15.9	23.0	27.2
4	10	2.7	3.8	4.6	3.0	4.3	5.1	3.7	5.3	6.3
	20	5.0	7.2	8.5	5.6	8.1	9.5	6.9	10.0	11.8
	30	7.2	10.4	12.3	8.0	11.6	13.8	9.9	14.4	17.0
	40	9.3	13.5	16.0	10.5	15.2	17.9	12.9	18.7	22.1
	50	11.5	16.6	19.7	12.9	18.7	22.1	15.9	23.0	27.2
5	10	4.7	6.7	8.0	5.2	7.6	8.9	6.4	9.3	11.0
	20	8.7	12.6	14.9	9.8	14.1	16.7	12.0	17.4	20.6
	30	12.6	18.2	21.5	14.1	20.4	24.1	17.4	25.1	29.7
	40	16.3	23.7	28.0	18.3	26.5	31.4	22.6	32.7	38.7
	50	20.1	29.1	34.4	22.6	32.6	38.6	27.9	40.3	47.7
6	10	2.7	3.8	4.6	3.0	4.3	5.1	3.7	5.3	6.3
	20	5.0	7.2	8.5	5.6	8.1	9.5	6.9	10.0	11.8
	30	7.2	10.4	12.3	8.0	11.6	13.8	9.9	14.4	17.0
	40	9.3	13.5	16.0	10.5	15.2	17.9	12.9	18.7	22.1
	50	11.5	16.6	19.7	12.9	18.7	22.1	15.9	23.0	27.2
7	10	2.7	3.8	4.6	3.0	4.3	5.1	3.7	5.3	6.3
	20	5.0	7.2	8.5	5.6	8.1	9.5	6.9	10.0	11.8
	30	7.2	10.4	12.3	8.0	11.6	13.8	9.9	14.4	17.0
	40	9.3	13.5	16.0	10.5	15.2	17.9	12.9	18.7	22.1
	50	11.5	16.6	19.7	12.9	18.7	22.1	15.9	23.0	27.2
8	10	2.7	3.8	4.6	3.0	4.3	5.1	3.7	5.3	6.3
	20	5.0	7.2	8.5	5.6	8.1	9.5	6.9	10.0	11.8
	30	7.2	10.4	12.3	8.0	11.6	13.8	9.9	14.4	17.0
	40	9.3	13.5	16.0	10.5	15.2	17.9	12.9	18.7	22.1
	50	11.5	16.6	19.7	12.9	18.7	22.1	15.9	23.0	27.2
Based on:			Calibration factors:							
8-ft roof ridge height				1.1 on restrained						
8-ft floor to ceiling height				1.3 on unrestrained						

Table 8. Compare modified RB148-07/08 to 2006 IRC

Modified RB148-07/08 proposal compared to 2006 IRC										
	difference = (proposed/IRC)-1									
		85 MPH			90 MPH			100 MPH		
		% increase or decrease			% increase or decrease			% increase or decrease		
	BWL Spacing									
Method	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
2	10	-33%	-4%	14%	-25%	8%	28%	-8%	33%	57%
	20	24%	44%	22%	39%	61%	36%	72%	99%	68%
	30	43%	38%	17%	61%	55%	31%	99%	92%	62%
	40	17%	18%	0%	31%	33%	12%	62%	64%	38%
	50	1%	-7%	-21%	13%	4%	-12%	39%	29%	9%
3	10	-33%	-4%	14%	-25%	8%	28%	-8%	33%	57%
	20	24%	80%	70%	39%	102%	91%	72%	149%	136%
	30	43%	108%	64%	61%	133%	83%	99%	187%	126%
	40	17%	69%	40%	31%	89%	57%	62%	134%	94%
	50	1%	46%	10%	13%	63%	24%	39%	102%	52%
4	10	-33%	-4%	14%	-25%	8%	28%	-8%	33%	57%
	20	24%	44%	22%	39%	61%	36%	72%	99%	68%
	30	43%	38%	17%	61%	55%	31%	99%	92%	62%
	40	17%	18%	0%	31%	33%	12%	62%	64%	38%
	50	1%	-7%	-21%	13%	4%	-12%	39%	29%	9%
5	10	16%	68%	99%	30%	89%	123%	61%	133%	176%
	20	118%	152%	113%	144%	182%	138%	201%	249%	194%
	30	151%	142%	105%	181%	171%	129%	247%	235%	183%
	40	104%	107%	75%	129%	132%	96%	183%	186%	142%
	50	76%	63%	38%	97%	83%	54%	144%	126%	91%
6	10	-33%	-4%	14%	-25%	8%	28%	-8%	33%	57%
	20	24%	44%	22%	39%	61%	36%	72%	99%	68%
	30	43%	38%	17%	61%	55%	31%	99%	92%	62%
	40	17%	18%	0%	31%	33%	12%	62%	64%	38%
	50	1%	-7%	-21%	13%	4%	-12%	39%	29%	9%
7	10	-33%	-4%	14%	-25%	8%	28%	-8%	33%	57%
	20	24%	44%	22%	39%	61%	36%	72%	99%	68%
	30	43%	38%	17%	61%	55%	31%	99%	92%	62%
	40	17%	18%	0%	31%	33%	12%	62%	64%	38%
	50	1%	-7%	-21%	13%	4%	-12%	39%	29%	9%
8	10	-33%	-4%	14%	-25%	8%	28%	-8%	33%	57%
	20	24%	44%	22%	39%	61%	36%	72%	99%	68%
	30	43%	38%	17%	61%	55%	31%	99%	92%	62%
	40	17%	18%	0%	31%	33%	12%	62%	64%	38%
	50	1%	-7%	-21%	13%	4%	-12%	39%	29%	9%
overall average =		27%			42%			76%		
overall average excluding method 5 =		16%			30%			60%		

Table 9. Compare modified RB148-07/08 to 1950-1999 Historic

Modified RB148-07/08 compared to Historic										
	difference = (proposed - historic) / proposed									
		85 MPH			90 MPH			100 MPH		
		% increase or decrease			% increase or decrease			% increase or decrease		
	BWL Spacing									
Method	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
2	10	-67%	-52%	-43%	-63%	-46%	-36%	-54%	-33%	-21%
	20	-38%	-10%	6%	-30%	1%	19%	-14%	24%	47%
	30	-20%	15%	36%	-11%	29%	53%	10%	60%	89%
	40	-22%	13%	33%	-13%	26%	49%	8%	56%	84%
	50	-4%	39%	64%	7%	55%	84%	33%	92%	127%
3	10	-67%	-52%	-43%	-63%	-46%	-36%	-54%	-33%	-21%
	20	-38%	-10%	6%	-30%	1%	19%	-14%	24%	47%
	30	-20%	15%	36%	-11%	29%	53%	10%	60%	89%
	40	-22%	13%	33%	-13%	26%	49%	8%	56%	84%
	50	-4%	39%	64%	7%	55%	84%	33%	92%	127%
4	10	-67%	-52%	-43%	-63%	-46%	-36%	-54%	-33%	-21%
	20	-38%	-10%	6%	-30%	1%	19%	-14%	24%	47%
	30	-20%	15%	36%	-11%	29%	53%	10%	60%	89%
	40	-22%	13%	33%	-13%	26%	49%	8%	56%	84%
	50	-4%	39%	64%	7%	55%	84%	33%	92%	127%
5	10	-42%	-16%	0%	-35%	-6%	12%	-19%	17%	38%
	20	9%	57%	86%	22%	76%	109%	51%	118%	158%
	30	39%	102%	139%	56%	126%	167%	93%	179%	230%
	40	36%	97%	133%	53%	121%	161%	89%	173%	223%
	50	68%	143%	187%	88%	172%	222%	132%	236%	297%
6	10	-67%	-52%	-43%	-63%	-46%	-36%	-54%	-33%	-21%
	20	-38%	-10%	6%	-30%	1%	19%	-14%	24%	47%
	30	-20%	15%	36%	-11%	29%	53%	10%	60%	89%
	40	-22%	13%	33%	-13%	26%	49%	8%	56%	84%
	50	-4%	39%	64%	7%	55%	84%	33%	92%	127%
7	10	-67%	-52%	-43%	-63%	-46%	-36%	-54%	-33%	-21%
	20	-38%	-10%	6%	-30%	1%	19%	-14%	24%	47%
	30	-20%	15%	36%	-11%	29%	53%	10%	60%	89%
	40	-22%	13%	33%	-13%	26%	49%	8%	56%	84%
	50	-4%	39%	64%	7%	55%	84%	33%	92%	127%
8	10	-67%	-52%	-43%	-63%	-46%	-36%	-54%	-33%	-21%
	20	-38%	-10%	6%	-30%	1%	19%	-14%	24%	47%
	30	-20%	15%	36%	-11%	29%	53%	10%	60%	89%
	40	-22%	13%	33%	-13%	26%	49%	8%	56%	84%
	50	-4%	39%	64%	7%	55%	84%	33%	92%	127%
overall average =		7%			20%			48%		
overall average excluding method 5 =		-3%			8%			34%		