May 14, 2015
Lorilee Medders
Chair, Florida Commission on Hurricane Loss Projection Methodology

During the course of the recent review of the Florida Public Hurricane Loss Model by the professional team of the Commission it was discovered that there were errors in forms V1 and S4 and in table 29 in Standard S5 of the document for v5.0 submitted in 2012. The errors are minor. More specifically:
1. In Form V1 we had produced the results with mitigation features on and off. Mistakenly, we reported the values with the features on. The corrected version of the form is without the mitigation, as it should be. Attached is the corrected form V1 for v5.0. The changes are small.

2. Under 2011 standards, the model received some new validation data for Personal Residential Losses and applied demand surge to the new data, but forgot to apply it to the old data (table 29 in disclosure 1 in standard S5). The error was discovered during the pro team visit this year and was corrected resulting in changes in some modeled losses for Table 29. The change also led to change in Form S-4. Some changes in Form S-4 were also due to relabeling so as to be consistent with the company labels used in Table 29. The values in Table 30 for validation for Commercial Residential Losses changed for Hurricane Charley for one company. There was a small processing error that was discovered by the Computer Science team for this company and Hurricane Charley which was corrected.
Attached are the corrected form S4 and corrected table 29 of disclosure 1 in standard S5 of the 2011 standards submission.

Sincerely,

Dr. Shahid Hamid
PI, Florida Public Hurricane Loss Model Project

S-5 Replication of Known Hurricane Losses

The model shall estimate incurred losses in an unbiased manner on a sufficient body of past hurricane events from more than one company, including the most current data available to the modeling organization. This standard applies separately to personal residential and, to the extent data are available, to commercial residential. Personal residential experience may be used to replicate structure-only and contents-only losses. The replications shall be produced on an objective body of loss data by county or an appropriate level of geographic detail and shall include loss data from both 2004 and 2005.

Table 29 compares the modeled and actual total losses by hurricane and company for personal residential coverage. Moreover, Figure 89 indicates reasonable agreement between the observed and modeled losses. This was also supported by the various statistical tests described below.

Disclosures

1. ***Describe the nature and results of the analyses performed to validate the loss projections generated by the model for personal and commercial residential separately. Include analyses for the 2004 and 2005 hurricane seasons.***

For model validation purposes, the actual and modeled losses for some selected companies and hurricanes are provided in Table 29.

Table 29. Total Actual vs. Total Modeled Losses - Personal Residential

Company Name	Event	Total Exposure	Total Actual Loss	Total Modeled Loss
A	**Charley**	**14572357458**	**274702333**	**198737120**
A	**Frances**	**9406748586**	**224656954**	**140035255.9**
B	**Charley**	**7155996653**	**110471361**	**124580043.6**
B	**Frances**	**1921696601**	**20201407**	**62163001.22**
C	**Charley**	**27568302239**	**526544555**	**328479702**
C	**Dennis**	**8858384208**	**20384468**	**55684738**
C	**Frances**	**19509886123**	**392510598**	**270139416.4**
C	**Jeanne**	**39525022665**	**177552030**	**401863199.6**
C	**Katrina**	**6232468582**	**19712702**	**79909488.96**
C	**Wilma**	**39461443904**	**340628254**	**543021524.1**
D	**Charley**	**1377700566**	**63889029**	**22384465.48**
D	**Frances**	**4304794382**	**122776727**	**72902654.33**
E	**Charley**	**35580184**	**952353**	**664538.39**
E	**Frances**	**316411703**	**10007410**	**4158595.87**
E	**Charley**	**2498971217**	**113313510**	**47276226.01**
E	**Frances**	**3631578831**	**78377163**	**59875813.43**

E	**Jeanne**	**4307858204**	**40245030**	**71539354.47**
F	**Charley**	**1386793895**	**32316645**	**20282578.33**
G	**Charley**	**587526292**	**3884930**	**6641333.28**
G	**Frances**	**179081534**	**2918642**	**3636948.23**
G	**Katrina**	**135143330**	**464971**	**858448.83**
G	**Wilma**	**767025160**	**6120435**	**9217331.98**
H	**Charley**	**844602098**	**78535467**	**51557230.62**
H	**Dennis**	**28266337**	**928111**	**2142032**
H	**Jeanne**	**1854530377**	**74983526**	**54296228.26**
H	**Katrina**	**6903619**	**330018**	**234998.48**
H	**Wilma**	**727865863**	**47056668**	**18797871.31**
I	**Charley**	**2506896464**	**62086256**	**50785421.04**
I	**Frances**	**71919163**	**43799401**	**6963321.91**
K	**Jeanne**	**6169965775**	**84545829**	**91067794.18**
L	**Charley**	**932092266**	**79751698**	**57010970.62**
L	**Jeanne**	**2558106618**	**81552694**	**96710294.33**
M	**Charley**	**41558803**	**4511656**	**2573848.34**
M	**Charley**	**166263166**	**8645559**	**3234270.76**
M	**Frances**	**34555100**	**4009884**	**1406555.74**
M	**Frances**	**367999344**	**11489176**	**5682778.26**
M	**Jeanne**	**78735391**	**3590284**	**3305877.8**
M	**Jeanne**	**347104726**	**4812837**	**6090394.27**
N	**Charley**	**1517072812**	**15135021**	**22447000.25**
N	**Frances**	**788753177**	**9399468**	**16050203.8**
N	**Jeanne**	**2272770727**	**9048905**	**27699686.43**
O	**Charley**	**9974317521**	**250201871**	**155825974.9**
O	**Frances**	**8000326844**	**185676998**	**154776744**
O	**Jeanne**	**15900477962**	**127752952**	**208018427.6**
O	**Katrina**	**482901644**	**1498112**	**4203642.78**
O	**Wilma**	**13042930295**	**156638501**	**170034281.5**
P	**Charley**	**475100767**	**2015902**	**3091625.89**
P	**Frances**	**1078479766**	**2659551**	**4844500.19**
P	**Jeanne**	**905676619**	**29144703**	**36604823.82**
P	**Jeanne**	**1436506385**	**2059383**	**6232773.82**
Q	**Jeanne**	**3434049257**	**31066792**	**52236441.42**
R	**Andrew**	**30391564010**	**2984373067**	**2172367393**
R	**Charley**	**427213972**	**23395988**	**16336023.08**
R	**Charley**	**51283638860**	**1037108745**	**602805672.9**
R	**Dennis**	**8560926395**	**30098559**	**55014031**
R	**Erin**	**3193215496**	**50519119**	**59625732.57**
R	**Frances**	**467259719**	**18467176**	**7747285.5**
R	**Frances**	**35893609287**	**614006549**	**415018853.8**
R	**Katrina**	**19486034141**	**54163254**	**102899060.9**
R	**Wilma**	**80021657140**	**1185407656**	**732908955.2**
S	**Jeanne**	**1178562197**	**3125588**	**14861814.76**
T	**Charley**	**9721434560**	**111013524**	**216617817.9**
T	**Frances**	**12560929210**	**94272660**	**377791772.1**

U	**Charley**	**2685932544**	**54207520**	**41706065.94**
U	**Frances**	**3525383315**	**121893725**	**51665575.16**

Figure 89 provides a comparison of total actual losses vs. total modeled losses for different hurricanes. The comparison indicates a reasonable agreement between the actual and modeled losses. The correlation between actual and modeled losses is found to be 0.970, which shows a strong positive linear relationship between actual and modeled losses. We tested whether the difference in paired mean values equals zero using the paired t test ($t = 1.43$, $df = 64$, p-value = 0.1576) and Wilcoxon signed rank test ($Z = 0.8038$, p-value = 0.4215). Based on these tests, we failed to reject the null hypothesis of equality of paired means and concluded that there is insufficient evidence to suggest a difference between actual and modeled losses. We also observed from Table 29 that about 51% of the actual losses are more than the corresponding modeled losses, and 49% of the modeled losses are more than the corresponding actual losses. This shows that our modeling process is not biased. Following Lin (1989), the bias correction factor (measure of accuracy) is obtained as 0.946, and the sample concordance correlation coefficient is found to be 0.918, which again shows a strong agreement between actual and modeled losses.

Due to the lack of a sufficient body of claims data for commercial losses, extensive statistical tests were not conducted to validate the model losses. Table 30 shows a tabular comparison of the modeled vs. actual commercial insured loss costs for illustration purposes (Wilcoxon Signed Rank Test Statistic = 23, p-value = 0.5469).

Table 30. Comparison of Total vs. Actual Losses - Commercial Residential

Company	Event	TotalExposure	TotalActualLoss	TotalModeledLoss
D	Charley	$ 2,330,314,147.00	$ 64,378,393.00	$ 41,577,368.33
D	Jeanne	$ 4,866,082,786.00	$ 34,826,257.00	$ 91,253,833.37
D	Katrina	$ 6,489,785,877.00	$ 11,846,697.00	$ 29,613,473.16
D	Wilma	$ 20,490,736,703.00	$318,671,056.00	$ 192,220,824.24
R	Frances	$ 861,896,543.00	$ 42,238,244.00	$ 10,437,972.70
R	Jeanne	$1,021,543,325.00	$ 8,446,718.00	$11,967,504.05
R	Katrina	$ 224,056,700.00	$ 2,178,110.00	$ 8,852,463.23
R	Wilma	$ 2,423,207,666.00	$ 62,492,371.00	$ 14,252,608.97

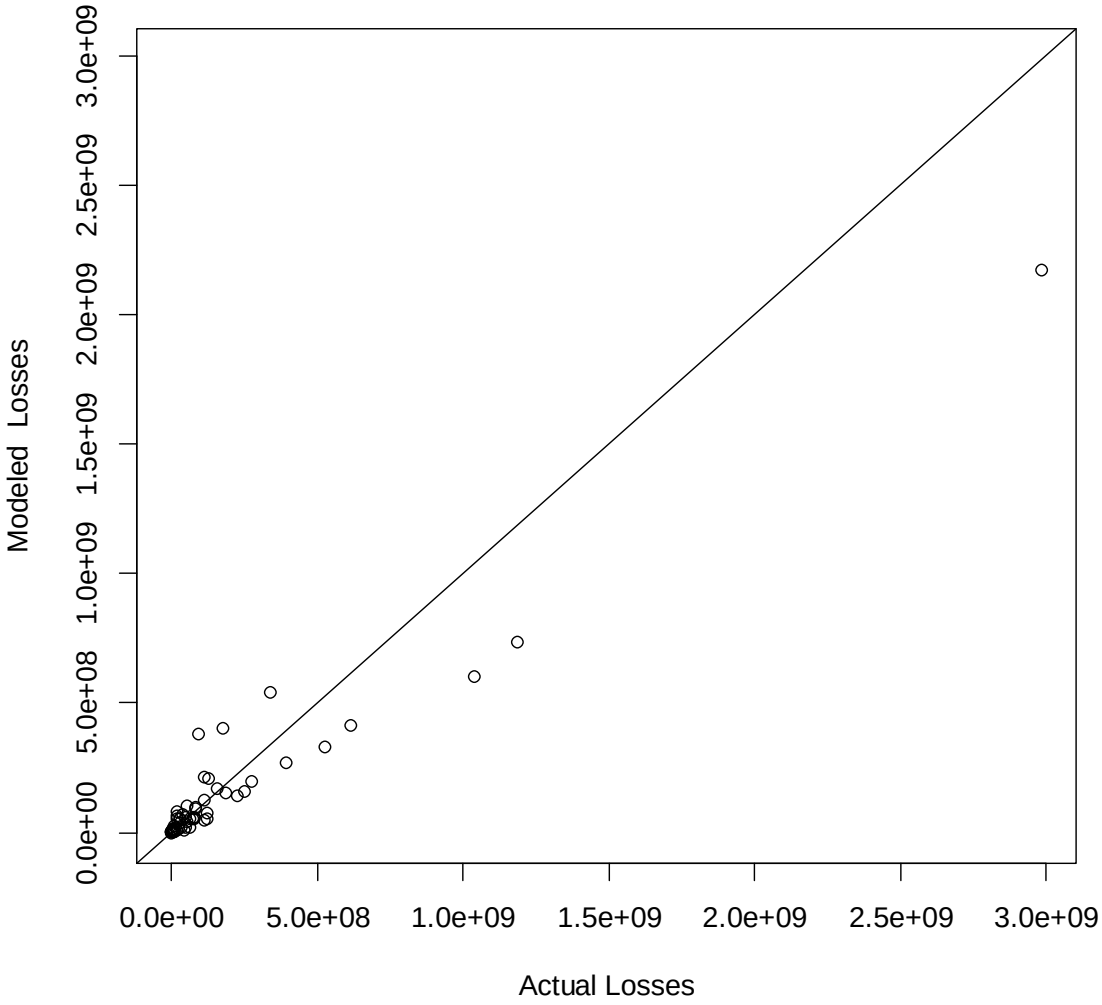

Figure 86. Scatter plot between total actual losses vs. total modeled losses.

2. ***Provide a completed Form S-4, Validation Comparisons. Provide a link to the location of the form here.***

Please see the completed Form S-4 at the end of this section.

Form S-4: Validation Comparisons

A. *Provide five validation comparisons of actual personal residential exposures and loss to modeled exposures and loss. These comparisons must be provided by line of insurance, construction type, policy coverage, county or other level of similar detail in addition to total losses. Include loss as a percent of total exposure. Total exposure represents the total amount of insured values (all coverages combined) in the area affected by the hurricane. This would include exposures for policies that did not have a loss. If this is not available, use exposures for only those policies that had a loss. Specify which was used. Also, specify the name of the hurricane event compared.*

B. *Provide a validation comparison of actual commercial residential exposures and loss to modeled exposures and loss. Use and provide a definition of the model's relevant commercial residential classifications.*

C. *Provide scatter plot(s) of modeled vs. historical losses for each of the required validation comparisons. (Plot the historical losses on the x-axis and the modeled losses on the y-axis.)*

Rather than using directly a specific published hurricane wind field, the winds underlying the modeled loss cost calculations must be produced by the model being evaluated and should be the same hurricane parameters as used in completing Form A-2.

Personal Residential

Comparison #1: Hurricane Charley and Company P by Coverage

	Company Actual	Modeled	Difference
Coverage	Loss/Exposure	Loss/Exposure	
Building	0.00764	0.00927	-0.00163
Contents	0.00007	0.00247	-0.00241
Appurtenants	0.00107	0.01045	-0.00938
ALE	0.00025	0.00175	-0.00150
Total	0.00424	0.00651	-0.00226

Comparison #2: Different Companies by Different Hurricanes

		Company Actual	Modeled	Difference
Company	Event	Loss/Exposure	Loss/Exposure	
K	Jeanne	0.01370	0.01476	-0.00106
R	Erin	0.01582	0.01867	-0.00285
B	Charley	0.01544	0.01741	-0.00197
P	Frances	0.00247	0.00449	-0.00203
P	Charley	0.00424	0.00651	-0.00226

Comparison #3: Company P by Hurricane Frances, Charley, Jeanne

		Company Actual	Modeled	Difference
Company	Event	Loss/Exposure	Loss/Exposure	
P	Frances	0.00247	0.00449	-0.00203
P	Charley	0.00424	0.00651	-0.00226
P	Jeanne	0.00143	0.00434	-0.00291

Comparison #4: Construction Type for Hurricane Charley

Construction	Company	Company Actual	Modeled	Difference
		Loss/Exposure	Loss/Exposure	
Frame	B	0.01363	0.01748	-0.00385
Masonry	B	0.01584	0.01739	-0.00155
Manufactured	R	0.05476	0.03824	0.01652
Other	A	0.01803	0.01493	0.00310

Comparison #5: County wise for Company A and Hurricane Frances

County	Company Actual	Modeled	Difference
	Loss/Exposure	Loss/Exposure	
Lee	0.000019	0.000025	-0.000007
Sarasota	0.000122	0.000076	0.000046
Collier	0.000031	0.000081	-0.000051
Madison	0.000865	0.000931	-0.000066
Manatee	0.000257	0.000333	-0.000076

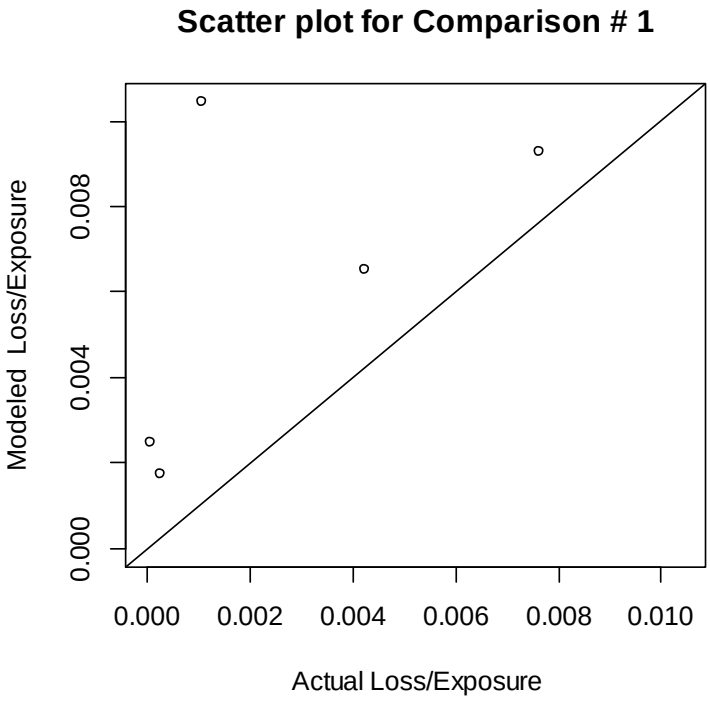

Figure 92. Scatter plot for comparison # 1.

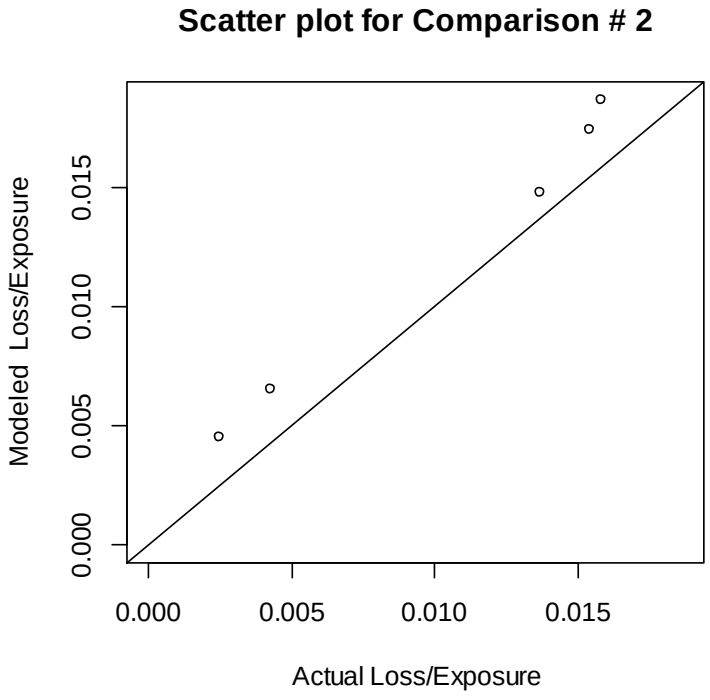

Figure 93. Scatter plot for comparison # 2.

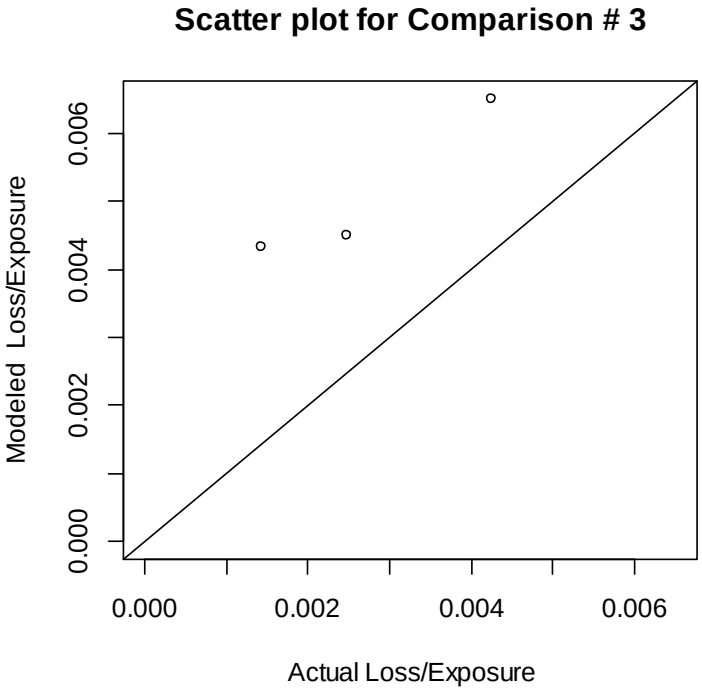

Figure 94. Scatter plot for comparison # 3.

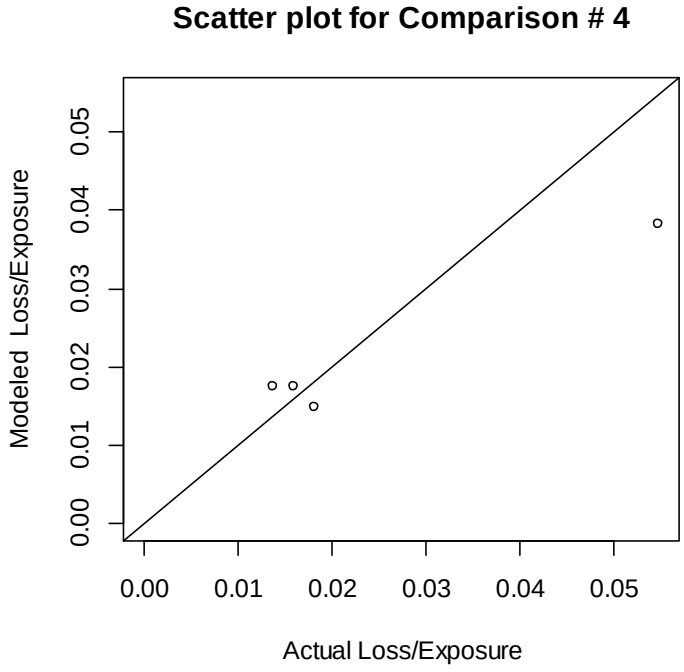

Figure 95. Scatter plot for comparison # 4.

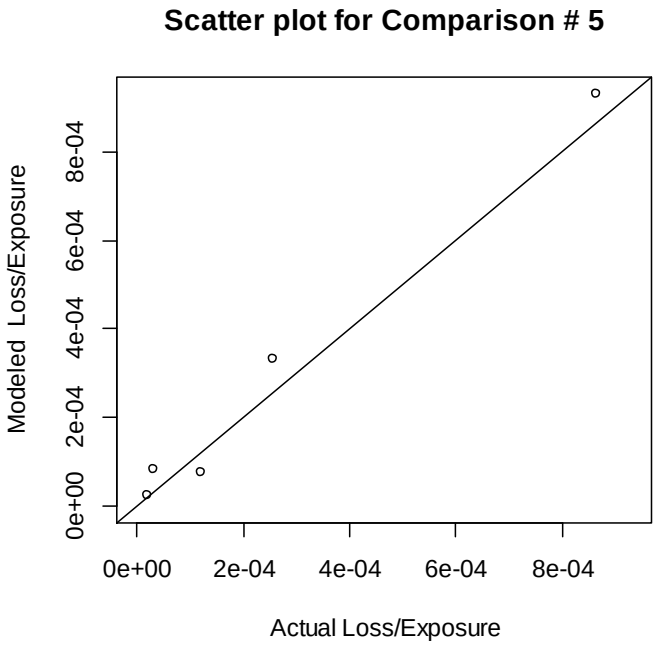

Figure 96. Scatter plot for comparison # 5.

Commercial Residential:

Comparison # 1: Companies D and M by Hurricane Charley, Katrina, Wilma, and Jeanne

		Company Actual	Modeled	Difference
Company	Event	Loss/Exposure	Loss/Exposure	
D	Charley	0.027626487	0.01784196	-0.0097845
D	Katrina	0.001825437	0.00456309	0.00273765
D	Wilma	0.015551957	0.00938086	-0.0061711
R	Jeanne	0.008268585	0.01171512	0.00344654

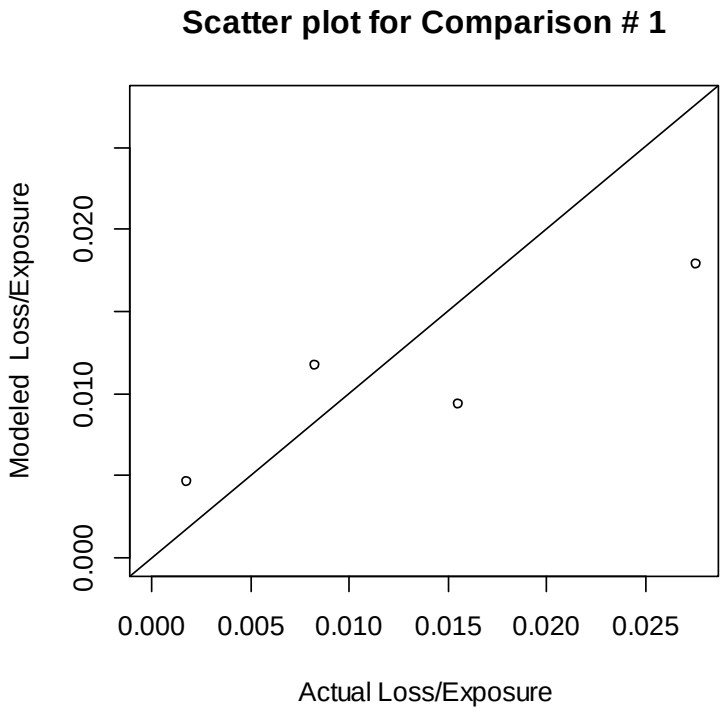

Figure 87. Scatter plot for comparison # 1.

FPHLM v5.0 2011 Standards

Form V-1: One Hypothetical Event

Part A

All reference structures combined.

Wind Speed (mph) 1 min sustained Wind	Estimated Damage/ Subject Exposure
41-50	0.00%
51-60	0.05%
61-70	0.37%
71-80	1.08%
81-90	3.27%
91-100	7.20%
101-110	10.78%
111-120	15.78%
121-130	21.60%
131-140	23.60%
141-150	27.98%
151-160	29.47%
161-170	31.52%

Only personal residential reference structures combined (Timber + Masonry + MH).

Wind Speed (mph) 1 min sustained Wind	Estimated Damage/ Subject Exposure
41-50	0.00%
51-60	0.68%
61-70	2.57%
71-80	3.73%
81-90	6.74%
91-100	12.30%
101-110	17.34%
111-120	25.34%
121-130	40.90%
131-140	43.82%
141-150	54.06%
151-160	57.07%
161-170	65.06%

Only commercial residential reference structures (Concrete).

Wind Speed (mph) 1 min sustained Wind	Estimated Damage/ Subject Exposure
41-50	0.00%
51-60	0.03%
61-70	0.32%
71-80	1.03%
81-90	3.20%
91-100	7.10%
101-110	10.65%
111-120	15.59%
121-130	21.21%
131-140	23.19%
141-150	27.45%
151-160	28.92%
161-170	30.85%

Part B

Construction Type	Estimated Damage/ Subject Exposure
Wood Frame	4.18%
Masonry	3.66%
Mobile Home	10.47%
Concrete	3.06%

The structures used in completing the form are identical to those in the table provided.

Part C

All reference structures combined.

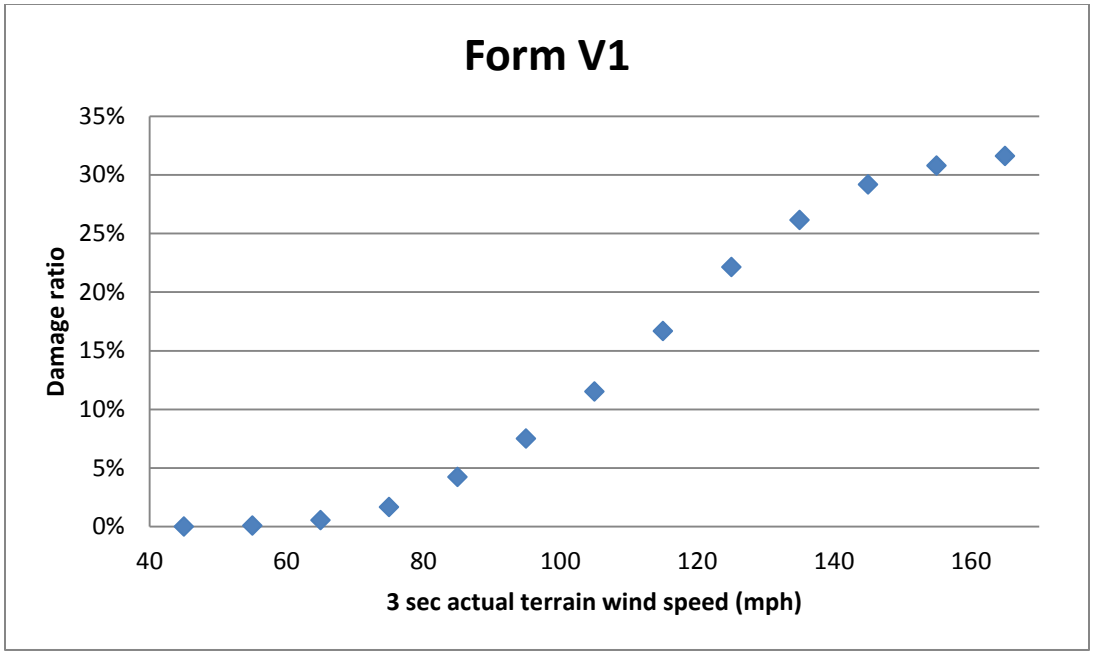

Figure 1. Structure damage vs. 3 sec actual terrain wind speed.

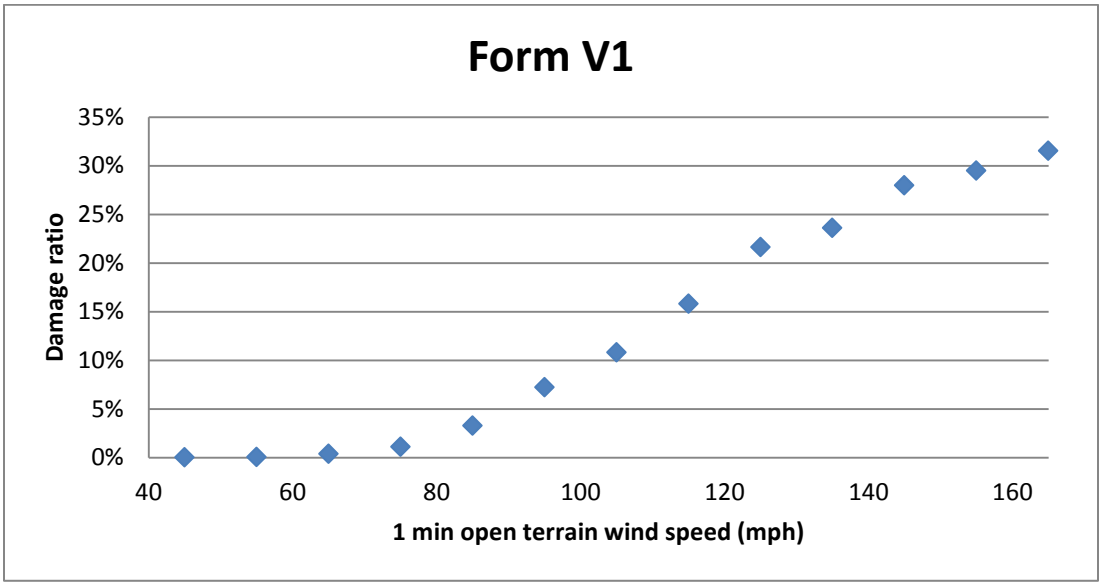

Figure 2. Structure damage vs. 1 minute sustained wind speed.

Only personal residential reference structures combined (Timber + Masonry + MH).

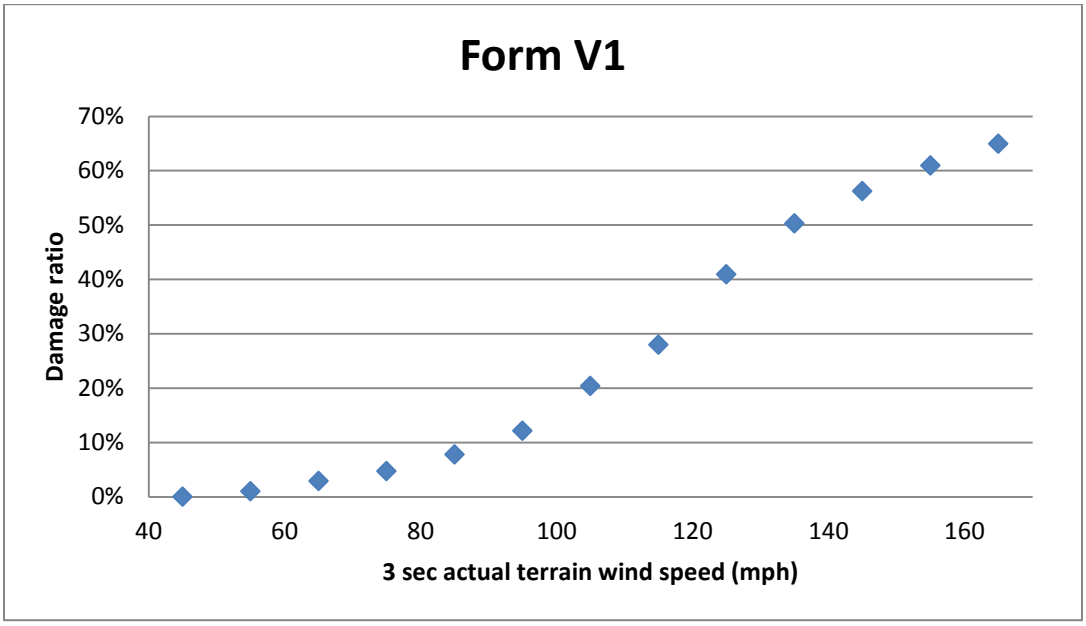

Figure 3. Structure damage vs. 3 sec actual terrain wind speed.

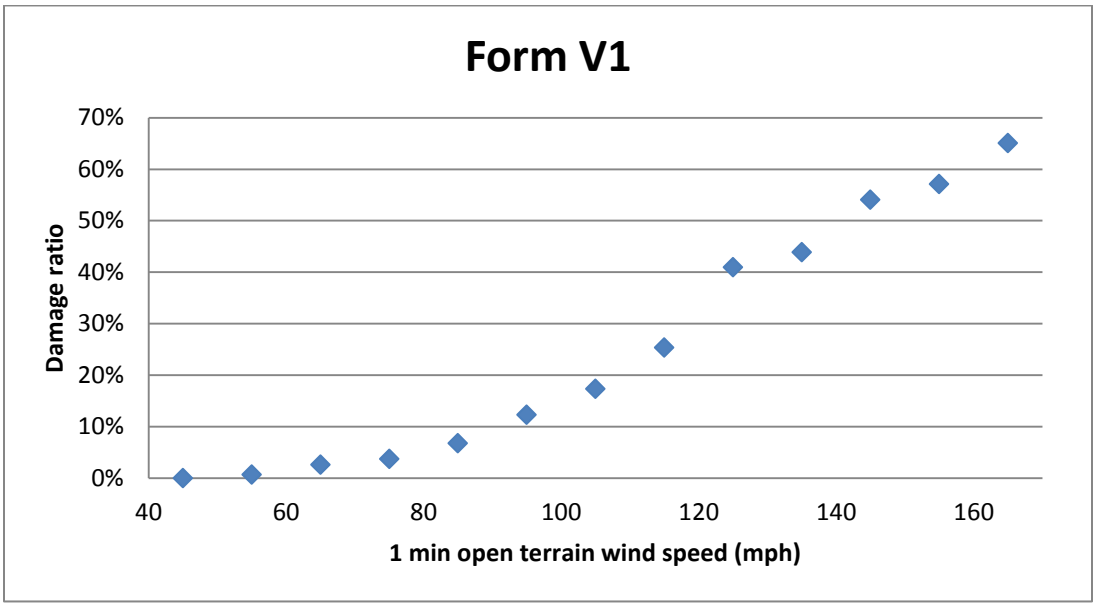

Figure 4. Structure damage vs. 1 minute sustained wind speed.

Only commercial residential reference structures (Concrete).

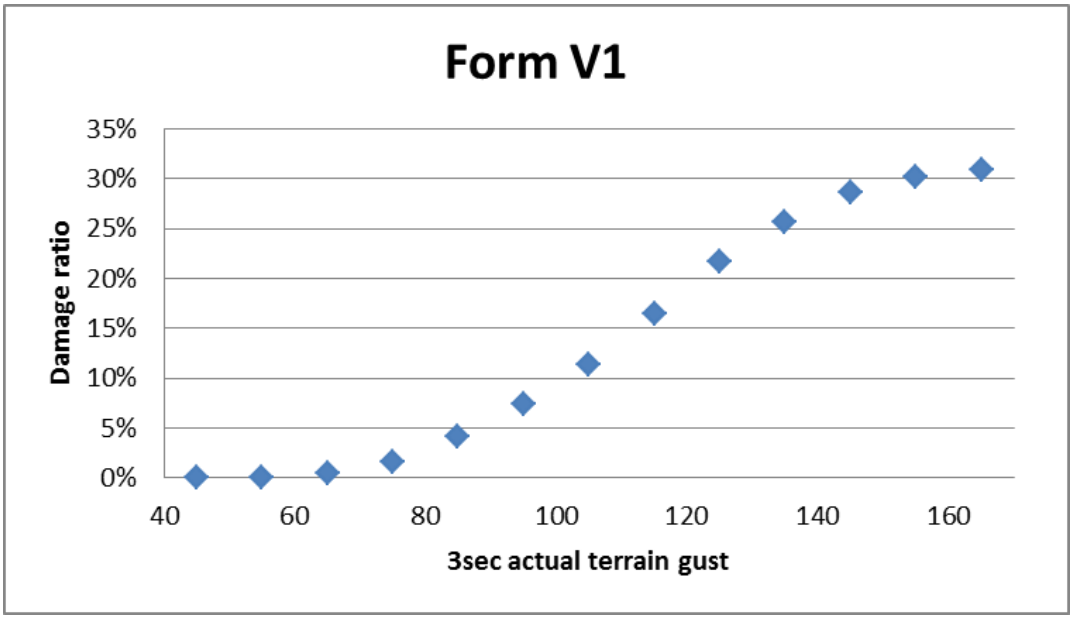

Figure 5. Structure damage vs. 3 sec actual terrain wind speed.

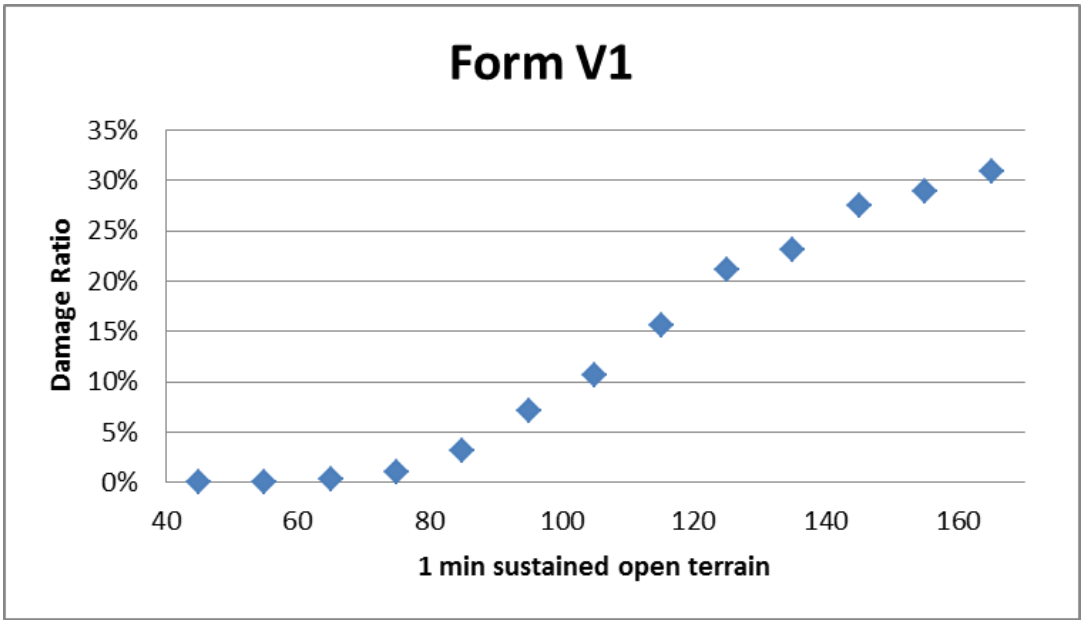

Figure 6. Structure damage vs. 1 minute sustained wind speed.