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Via Email

March 2, 2016

Ms. Kate Thompson
Texas Department of Insurance
P.O. Box 149104
Austin, Texas 78714-9104

Re: Review of TDI Expert Panel's February 3, 2016 Draft Final Report

Dear Ms. Thompson:

I am pleased to provide written comments on the Draft Final Report. I will make a few general comments in this cover letter and give you my detailed comments in the attached table.

My comments focus on: the structure of the overall methodology; the flood (storm surge and wave) aspects of the methodology; the interaction of wind and flood; and validation -- but not on the wind load calculations themselves.

The Expert Panel is qualified to tackle this complex problem, and has done so in a rational way. I find the report generally well-written and comprehensive, with a few exceptions (see comment table).

Please let me know if you have any questions or require additional information from me. Thank you.

Sincerely yours,

Christopher P. Jones, P.E.
CPJ/
enc.

Comment No.	Page	Comment
1	2-1, 1st ¶	We have had some email discussion on this item, but it is still not clear to me what is meant by "the extent to which a loss to insurable property was incurred as a result of wind, waves, tidal surges, ***or rising waters not caused by waves or surges***." I am not privy to any discussions between TDI and the Expert Panel regarding scope, but the method outlined in the report addresses damage due to surge and waves, and not to "rising waters not caused by surges and waves." I believe the method would have to be revised to address non-surge/wave flooding. This may be an artifact of legislative language and less important to TDI and the Expert Panel.
2	3-1 and Fig. 3-1	The overall structure of the methodology is appropriate and can address the slab issue, given sufficient information input into the methodology. This last point – sufficient information – will be the key to any successful application of the methodology. Even the default method (see p. 6-1 and Fig. 6-1) requires considerable data and modeling, and this may or may not be possible or justified in all cases. I am concerned for TDI in cases where sufficient data and modeling are not available, for whatever reason. I therefore suggest a three-tiered approach (observational, default, simplified) may be useful to allow for all cases, i.e., where data and modeling are plentiful and robust (observational method), to limited observational data (default method), to cases where data collection is less comprehensive and/or where modeling is not as detailed (simplified method). I expect the Expert Panel will say the default method is the minimum that can be employed, but I think a third approach should be explored. Page 6-1 and Fig. 6-1 open the door to less-than-observational, but how far can TDI go in this direction? I believe consideration of and an expanded and explicit discussion of different levels of analysis would be appropriate. The discussion of each level should include: minimum data needs (wind, surge, wave, structure), changes to modeling procedures and methodology, effects on confidence in the final results, and potential schedule and cost implications.
3	3-1, last ¶	Editorial. Delete "reasonably" from line 5.
4	Fig. 4-2	Editorial. Surge "height" has not been defined yet. I realize the lower graphic is illustrative, but I have seen too many people confuse surge elevation (with respect to a datum), surge height (above predicted tide level) and surge depth (above ground). The vertical axis or legend or figure caption should be clarified.
5	4-6, ¶ 2	This is the first of several recommendations by the Expert Panel to TDI regarding data collection and modeling, ultimately summarized in

		Section 11. I am curious what all this may cost, and whether a simplified approach (see Comment 2) should be explored.
6	4-6, ¶ 2, ¶ 3	There are several references to error analysis in the report (these two being among the earliest), but there is no discussion at the end of the report about how error estimates will propagate through the methodology and affect the results. How will errors affect timing of wind/surge/waves? How will errors affect estimated wind damage probability or surge collapse probability?
7	Fig. 5-1	The report uses the term "freeboard" but it is not defined. This figure would be a good place to do so.
8	5-3, last bullet	How will dunes and "other significant features impeding flow" be defined and resolved in the model. Since it seems the model will ultimately rely on post-event LiDAR for overland surge and wave calculations, is it important that the model be run with pre-storm topography and features? Or will there be an attempt to model the time-varying influence of shielding by protective features during the storm? The issue of shielding – and conversely the issue of generation of large floating debris – can affect the probability and timing of collapse due to flood and should be discussed (even if not addressed in the first version of the methodology). Or is it assumed that Tomiczek's results implicitly factor in shielding and debris, and if so, would the Tomiczek result be applicable at other locations?
9	5-6, last ¶	Text states, "Once surge and wave fields have been determined, the Panel recommends that TWIA compute the probability of slabbing for residential construction using Variant 5 of the methodology of Tomiczek et al. (2014)." Does this mean that Tomiczek (2014) equation 15 and collapse fragilities in Tomiczek Figure 10 (reproduced in the Expert Panel report as Figure 5-3) should be used for future storms and at other locations, or that a new equation and new fragilities should be derived for future storms and other locations?
10	5-6	Speaking of the Tomiczek methodology, I think it would be good to include more details on the methodology in the Expert Panel report, including derivation of the Variant 5 equation. The Expert Panel report goes into great detail on wind loads and wind damage calculations, but mentions the surge and wave damage methodology only by reference. I understand that the ultimate goal is to estimate wind damage to a slabbed structure, but the timing of wind and flood damage can be critical to this result, so I think it is therefore important to have some detailed discussion on application of the Tomiczek methodology in concert with surge and wave modeling.
11	Fig. 6-1	Probably editorial. Although the figure caption and related text distinguish between model and observational approaches, it is not clear from Figure 6-1 how the upper right observational diamond (Peak

		Wind Speed Surge & Wave Heights) is different from what would be obtained from the model trapezoid (Wind, Surge & Wave Time Histories). Would the trapezoid not produce peaks as well? I think it would -- but I think the trapezoid indicates *modeled* wind and surge and wave time histories, while the diamond indicates the addition of observational data and refinement of time histories. Perhaps some clarification to those two flow chart elements could be added.
12	6-4, 6-5	The example roof deck calculation is confusing. Please make sure this is correct (9 vs 10 properties would experience damage).
13	6-46, last ¶	Text mentions an expert elicitation to evaluate potential reduction of wind ***and flood*** resistance due to variations in construction practices. The next to last paragraph on p. 6-49 elaborates regarding installation variability (for components listed in Table 6-19), but mentions only wind. Items 8 (foundation installation in ground) and 7 (wall to foundation connection) in Tables 6-19 and 6-20 could definitely affect flood collapse as well as wind, but it is not clear if or how the experts differentiated between wind and flood reduction. Do the expert elicitation results factor into any flood calculations?
14	Table 6-20	I have not seen expert elicitation data, but it is interesting how close the remaining resistance is for all components in Table 6-20.
15	6-52	Table 6-20 note, component 8. Are there future plans to include foundation installation into the methodology?
16	Tables 6-22 and 6-23	Editorial. Text on bottom of page 6-57 explains the shading and boxes drawn in the tables. It would be good to add those notes to table captions. . . . and it may be a pdf conversion issue, but some of the shading obscures the table entries.
17	7-2, ¶ 2	How did the firm define the "water line" for the 56 properties, was it a measured elevation (surge, or including wave effects) at surviving buildings? How much variation was there in this elevation? How were floor support elevations determined for missing/collapsed structures? The significance of positive or negative freeboard is not questioned here, but the discussion does not provide any details on how critical elevations were determined.
18	Table 7.1	How does the methodology deal with slab cases where both wind and flood collapse probabilities are low, and close to one another? See location ICB1a. Incorporation of error estimates could reverse the outcome in cases like this?
19	Table 7-1	There are two surviving buildings where computed surge collapse probabilities > 0.50. What did field inspections of these properties show as far as wind and flood damage?
20	Sec. 7.2	Why were Charley and Ike data combined? Were building ages and

		other characteristics similar? Maybe it is OK to combine, but there is no justification for doing so in text. When examined by individual storm, do results vary from combined results? Figure 7-5 would be a good place to show individual storm data.
21	Tables 7-2 to 7-10	Plots would make it easier to visualize results and trends.
22	7-17, last ¶	Text indicates some TWIA properties had been inundated – would results be different if these properties were removed from the sample? Would analysis of just the inundated properties aid in evaluating the wind vs flood methodology?
23	7-19, last ¶	It appears that building age was not part of this validation analysis but could have contributed to the wind damage results. Could age be included and analysis re-run? Would the work be justified based on what we might learn?
24	Tables 7-12 to 7-20	Plots would make it easier to visualize results and trends.
25	Sec. 7	After reading about all the various validation tests, it occurs to me that it would be helpful to add a validation test summary table at the beginning of Section 7. The table should summarize the purpose of each test, what data were used (number, location and characteristics of structures), limitations imposed by data, and results.
26	11-1	Essential Recommendation 3. See comment 9. What specifically does this recommendation call for?
26	Sec. 11	The words “error” and “error estimate” are not mentioned in the section, although they are mentioned throughout the report as being important. One or more Recommendations should mention determination of errors resulting from the data, models and methodology, and mention how those errors could be evaluated and reduced.