

Commercial Residential Model Reviews

Prepared by the Professional Team for
The Florida Commission on Hurricane Loss Projection Methodology
May 2002

I. Background and Items for Consideration

In May, 2000, the Professional Team provided the Florida Commission on Hurricane Loss Projection Methodology with a report (“Hurricane Perils and Commercial Residential Properties” – Attachment 1) covering an overview of the criteria involved in the incorporation of Commercial Residential standards in the Commission’s review procedures. The Commission discussed the Attachment 1 material in its meetings in preparation of the 2001 Standards. At that meeting, the Commission expressed its desire to postpone its decisions, in part until the following items were resolved.

- 1) Approval of a model for both personal and commercial residential could jeopardize the former. In other words, will the addition of Commercial Residential standards necessitate a model to be accepted by the Commission for both single family dwellings and condos (personal and commercial residential)?
- 2) While several of the current standards would apply to both personal and commercial residential, the Commission needed more specific information relative to additional standards that would be needed if commercial residential coverages were to be added to the review process.
- 3) The Commission is in need of knowledge relative to the actual loss cost information that is available to verify commercial residential standards with insurance company data. This is especially true in light of the standard requirements relative to the use of insurance company data to verify the current standards. (Standards 5.4.1, 5.4.13, and 5.6.1)

In our subsequent discussions with modelers, we have found additional criteria that would be helpful to the Commission in its decisions relative to model acceptance for commercial residential insurance purposes.

- 4) There is no universally accepted industry definition of commercial residential. A decision must be made relative to the definition of “Commercial Residential” and how standards will be applied to insured properties that fall into the definition. An implicit definition via examples is given in the following:

Florida Administrative Code 4-170.0142 that deals with how to make a rate filing for commercial residential insurance includes a definition of "Commercial Residential Insurance":

For purposes of this rule, reference to commercial residential insurance shall include insurance on the following types of risks: condominium associations; apartment buildings; hotels and motels; dormitories (including sorority and fraternity houses); boarding houses and rooming houses.

- 5) The currently available insurance data relative to commercial lines of insurance (including commercial residential) is extremely sparse. Previously, the Commission has dealt with the lack of insurance company data for mobile home insurance and individual coverage and by zip code insurance records. Following our investigations, the Professional Team believes that the commercial residential data is as or more sparse than that which was available when mobile homes were incorporated into the Commission standards.
- 6) In order to review loss costs produced for condominium and apartment dwellers, some additional information is needed relative to the height of the structure and the effect of elevation upon wind speeds. This is currently a well documented phenomenon in structural and wind engineering practice and is an integral part of design engineering standards (ACSE 7, SBC, and so forth).
- 7) There is a far greater number of possible construction types in commercial construction than in single family dwelling structures. These construction differences influence the damage to individual units within the commercial building. Insurance data is rarely congruent with the engineering criteria used to determine individual unit vulnerability.
- 8) It is likely that major standards additions and revisions will relate to engineering or vulnerability criteria. The minimal amount of available insurance data is offset by a great amount of accepted engineering criteria and standards that have been in use for a substantial period of time. In addition, the engineering criteria have been developed with substantial consideration of the meteorological implications of elevation as well as the individual unit vulnerability described above.

II. Professional Team Recommendations

- 1) The Professional Team recommends that the acceptance of commercial residential standards be separated from the acceptance of "residential" standards. This is especially important in the initial years of commercial residential review. Modelers may be reluctant to jeopardize Florida acceptance of their current models to obtain acceptance of their commercial residential criteria. An all or nothing approach may have a significant negative

impact upon the modeling process and competition among modelers. (See Principle number 7 of the *Report of Activities as of November 1, 2001*, page 6.)

- 2) The Professional Team recommends that the Commission define “Commercial Residential” differently from the implicit statutory definition cited above. It appears to be far more meaningful for the Commission to review model outputs relative to condo and apartment residents than those in motels and dormitories. It is recommended that initial commercial residential activity be confined to condominium and apartment dwellers. It is recommended that the Commission refrain at this time from developing standards for high-rise condominium and apartment building structures.
- 3) Due to the lack of specific insurance data, standards for commercial residential should be based to a great extent upon engineering review and analysis. It is recommended that the Commission allow models to produce commercial residential loss costs in spite of the difficulty of insurance company data verification of the standards.
- 4) The Professional Team recommends that prior to initiating commercial residential standards, the Commission direct the Professional Team to develop requests for specific modeler information in an additional set of Modules. The new Module data will provide the basic information needed to produce meaningful and explicit commercial residential standards for future review.

ATTACHMENT 1 – May 2000 Professional Team Report

Hurricane Perils and Commercial Residential Properties

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Abstract

In the course of reviewing modeling companies for compliance to the 1999 Commission standards, the professional team met with modelers to discuss the possibility of expanding the scope of the Commission reviews to include commercial residential properties (e.g., high rise condominiums that are common along the coasts of Florida). This white paper summarizes the discussions of the professional team with the various modelers. In general, the state of understanding of commercial residential property resistance to hurricane perils is rather limited compared to residential property. There is a paucity of data supporting the development of vulnerability functions of commercial residential construction types to hurricane effects. The extent to which standards can be developed for commercial residential construction is described.

Meteorology. All of the existing meteorological standards apply for commercial residential construction. The historical storm set applies as the baseline for frequency and intensity of hurricanes. Some further consideration of wind profiles with elevation and interactions of multiple high rise buildings within zip codes may be required. The wind hazard itself can be thought of as providing extreme wind forces, wind borne debris, wind intrusion followed by potential water intrusion, storm surge and run-up and hurricane spawned tornadoes (not explicitly covered in the 1999 standards).

Vulnerability. Damage to commercial residential buildings occurs as the various components of the building's inherent wind force resistance systems break down. Examples include roof covering, exterior cladding, balcony sliding glass doors and glazing. Degradation of the roof leads to increased damage of the highest floors of the structure due to water intrusion. Water on upper stories often flows downward through the units' improperly sealed plumbing and air conditioning chases. Damage to the building envelope (roof, walls, doors, glazing, and so forth) that caused penetration may cause a redistribution of forces within the building, applying greater than design forces on elements due to openings to the building. The failure of one person to put on hurricane shutters in a high rise building could cause serious damage to adjacent units that were shuttered by destroying the interior drywall as the building's internal pressure inflates. Additional damage can occur to walls on the leeward face as the suction

on that face contributes to the push from the winds that have penetrated on the windward side. Since buildings will not normally experience structural failure, as explained below, the orientation and position of the unit in the building may have a major impact on how much it is damaged.

General vulnerability of a structure should depend on the construction type (reinforced concrete versus light steel construction, for example), condition of the building (degradation due to marine environment), year that the building was designed, design code, shape of the building, number of stories, occupancy type, and foundation. Usually, vulnerability progresses from the strongest to the weakest, as follows: reinforced concrete, heavy steel construction, reinforced masonry, light steel construction, non-reinforced masonry, timber construction, and non-engineered construction.

Further insights could be gleaned from consideration of various design codes such as South Florida Building Code (1994), ASCE 7-95 (with 7-98 forthcoming), BOCA Building Code (1996), Standard Building Code (1997) with other codes on the horizon. It should be noted that the State of Florida will likely adopt "Florida Code" which is a version of the Standard Building Code with additions made to keep the more hurricane resistant provisions of the two South Florida building Codes in Dade and Broward county. Additionally, the Standard code, BOCA Code and the Uniform Building Code will shortly band together and publish the new International Code, after which their individual codes will cease to be maintained. After that point, Florida could adopt a version of the international Code, which would guide engineers designing structures in Florida.

Further complexities exist in the wind forces that a high rise building will encounter, in that gusts and eddies that travel through canyons formed by other buildings as well as the natural frequencies of building response and torsional effects can cause building to magnify the forces of the wind. Wind tunnel testing with simulated buildings in the area is required to obtain a true picture of the forces on a major building.

With the exception of storm surge and wave action, which will likely undermine foundations of older buildings adjacent to beaches, the main structural frames of pile supported buildings should fare well, if properly designed. The majority of damage should consist of interior drywall damage, window and door breakage and all the normal damage associated with single family homes. Little, if any, non-flood structural damage should be seen to the main frames of high rise buildings, even in storms having the strength of Andrew.

The existing "50 rule" in the South Florida Building Codes may have a great deal of impact on the reparability of high rise structures that are damaged in a major hurricane since the interior finishes, drywall, cabinets, windows, doors, roofing and other non-structural elements always exceed 50% of the buildings value and the fact that the structural frame is not damaged is not always

sufficient to allow rebuilding, particularly in Broward county, which requires depreciation to be deducted from the value of the building as it existed before the storm. This provision forces comparison with modern construction prices and methods when determining the repair cost. In contrast, Dade county does not require depreciation in this calculation.

Actuarial issues. The existing standards on actuarial aspects of loss cost estimation would be expected to be applicable to commercial residential structures with the obvious caveat that pertinent insurance data be used. As mentioned previously, such data are rare, so that professional judgment will play a larger role than with residential structures. Also, the separation of owner versus tenant insurer needs to be made explicit in analyzing the available insurer data. Facultative coverage will likely be the norm rather than the exception.

While the actual deductibles may differ from those used in residential coverage, the standards will need little or no revision relative to deductible relativities. Additional standards may be needed relative to building versus contents coverage and how each is covered in the policies. Logical relation to risk should require little, if any, revision. Conceivably, it may be prudent to expand standard 5.4.1 as there will be more “adjustments” necessary to incorporate any insurer input into the model. Co-insurance may play a greater role and may need emphasis in the commercial residential standards. Modifications may be more prevalent, but will probably allow the current standard language to lead to future standard expansion, if needed. Standard will need to be revisited since insurer inputs such as building height, other occupancies, and so forth may need to be added. Similar additions and considerations may be needed for standard 5.4.8. It will likely be useful to examine how additional living expense is derived, for example, when the insured unit is minimally damaged while the building is declared uninhabitable. As in the vulnerability discussion given above, another assessment of business codes as they affect policy costs is indicated.

Computer Science and General Standards. Standards from these two sections carry over to commercial residential structures. One possible addition is that for the modeler personnel, the individual(s) responsible for engineering ought to have expertise in high rise structures.

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