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Commercial

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CHANGES

The filing revises our Louisiana Windstorm Mitigation Program rule in response to LA. REV. STAT. ANN. § 22:1483 (2021), which in part provides that windstorm mitigation credits shall be applied when insureds build or retrofit a structure to comply with the requirements of the Louisiana State Uniform Construction Code or the Insurance Institute for Business and Home Safety (IBHS®)).

COMPANY ACTION

If you have authorized us to file on your behalf and decide:

- To use our revision and effective date, you are NOT required to file anything with the Louisiana Department of Insurance.
- To use our revision with a different effective date, to use our revision with modification, or to NOT use our revision, you must make an appropriate submission with the Louisiana Department of Insurance.

In all correspondence with the Louisiana Department of Insurance regarding this revision, include the PIAL and/or State Filing Designation Number.

MANUAL DISTRIBUTION

Insurance Service Office, Inc. will distribute revised manual pages prior to the effective date. A complete copy of the filing is available on the PIAL website using the Compliance Filings Library. Register to receive electronic notification at the Compliance Filings Library at www.pial.org.

DIVISION FIVE – FIRE AND ALLIED LINES

70. CAUSES OF LOSS – BASIC FORM

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The following is added to Paragraph **E.:**

3. Windstorm Construction Program

a. Introduction

With respect to all single-family residential properties and commercial properties, insurers shall provide for premium discounts, credits or other adjustments to reduce premiums when an insured builds or retrofits a structure to resist loss due to hurricane, tornado or other catastrophic windstorm events in compliance with the requirements of the Insurance Institute for Business & Home Safety (IBHS®).

b. Eligibility

Insurable properties, including single-family residential properties and commercial properties, are eligible for credit if the property has been certified as constructed in accordance with the Fortified Home™ or Fortified Commercial™ program promulgated by the IBHS®. The credit or discount shall apply only to policies that provide wind coverage and does not apply if the insured elects to exclude coverage for Wind and Hail losses through Windstorm Or Hail Exclusion – Direct Damage Endorsement **CP 10 53.**

c. Proof Of Compliance

The following applies to property eligible for the IBHS® Fortified Home™ or Fortified Commercial™ program:

(1) An insurable property shall be certified as constructed in accordance_with the Fortified Home or Fortified Commercial standards only after inspection and certification by an IBHS® certified inspector.

(2) An owner of insurable property claiming a credit or discount shall maintain and provide certification records and construction records, including certification of compliance with the IBHS® standards, for which the owner seeks a discount. Such documents may include but are not limited to receipts for contractors, receipts for materials, and records from local building officials. The IBHS® certification documents shall be considered evidence of compliance with the Fortified Home or Fortified Commercial standards. The certification shall be presented to the insurer or potential insurer of a property owner before the adjustment becomes effective for the insurable property along with any other necessary records.

(3) The credit will only apply for five years from the date of the designation. In order to continue receiving the mitigation credit after five years, the property must be re-inspected and re-designated by the IBHS®. If the IBHS® designation expires, the applicable mitigation credit will expire upon renewal.

d. Wind Mitigation Discount Procedure

Use state Table **70.E.3.d.** to determine the Windstorm Loss Mitigation Credit for the applicable certificate level for the risk. The credit applies to the rate or premium for Basic Group **II** coverage on the building and its contents:

	IBHS FORTIFIED Home Or Commercial Certificate Level		
Territory	**Bronze/Roof**	**Silver**	**Gold/FSL**
Zone 1	23 %	28 %	29 %
Zone 2	16	20	21
Zone 3	38	48	51
Zone 4	47	59	64
Zone 5	54	63	68

Table 70.E.3.d. Windstorm Loss Mitigation Credits

e. Building Code Effectiveness Grading

If a premium credit under Paragraph **E.3.** applies to the risk, the Basic Group **II** factor in Additional Rule **A1.** does not apply.

f. Windstorm Loss Mitigation – Midterm Installation

When mitigation measures are installed midterm, premium adjustment is required on a pro rata basis.

Louisiana Windstorm Construction Program Rules Updated

About This Filing

The filing revises our Louisiana Windstorm Mitigation Program rule in response to LA. REV. STAT. ANN. § 22:1483 (2021), which in part provides that windstorm mitigation credits shall be applied when insureds build or retrofit a structure to comply with the requirements of the Louisiana State Uniform Construction Code or the Insurance Institute for Business and Home Safety (IBHS®)).

New Rules

We are introducing the following additional rules:

- Division Four - Farm
  - Rule A11. Windstorm Construction Features (Non-Residential)
- Division Ten – Businessowners
  - Rule A5. Windstorm Construction Program

Revised Rules

We are revising the following additional rules and state exceptions:

- Division Four - Farm
  - Rule A7. Windstorm Construction Features (Residential)
- Division Ten – Businessowners
  - Rule 23. Premium Development - Mandatory Coverages
- Division Five - Fire and Allied Lines
  - Rule 70. Causes of Loss Basic Form

We have used a format of ~~striking-through~~ deletions, underlining additions and inserting a revision bar in the left margin to indicate changes. For the purposes of this filing, asterisks (***) indicate undisplayed text that remains unchanged with this filing.

Background

LA. REV. STAT. ANN. § 22:1483 C. (1), in part, states:

"After July 1, 2022, all insurers required to submit rating plans to the commissioner may, if actuarially justified, provide credits and discounts in compliance with the fortified home and fortified commercial standards created by the Insurance Institute for Business and Home Safety. Any homeowner who is currently receiving discounts pursuant to this Section may opt to maintain discounts offered prior to July 1, 2022, if the homeowner continues to meet the requirements to maintain such discounts, in lieu of the discount provided in this Subsection"

Explanation of Changes

In response to the aforementioned Louisiana statute, we are introducing Additional Windstorm Construction Program rules for Commercial Property, Businessowners and Farm Rule A11 Windstorm Construction Features (Non-Residential) to include:

- wind mitigation credits to an insured who builds or retrofits a structure to resist loss due to hurricane, tornado, or other catastrophic windstorm events in compliance with the Insurance Institute for Business & Home Safety (IBHS®)
- That a commercial or residential insurable property is eligible for credit from the Insurance Institute for Business & Home Safety if the property has been certified as constructed in accordance with the Fortified Commercial™ program or Fortified Home™ program promulgated by the IBHS®. These credits are in place of, not in addition to, other mitigation adjustments including those in place prior to January 1, 2022 if they are deemed to be duplicative.
- Procedures for certification that an insurable property has been constructed in accordance with fortified home or commercial standards.
- Premium determination instructions for applying the windstorm loss mitigation factor/credit or percentage to determine the adjusted building loss cost for policies where windstorm or hail coverage is not excluded. New tables of Windstorm Loss Mitigation factors/credits provide windstorm loss mitigation factors/credits based on compliance with the Fortified Home™ or Fortified Commercial™ program promulgated by the IBHS®.

For Farm we are also revising Rule **A7.** Windstorm Construction Features (Residential) to provide the aforementioned overview, eligibility and premium determination instructions related to the Fortified Home™ program promulgated by the IBHS®. Since the inured has the option of continuing to receive windstorm loss mitigation credits based on compliance with the Louisiana State Uniform Construction Code we are maintaining Table A.7.F. and revising the current windstorm loss mitigation credits.

Attachment(s)

- Actuarial Support including Appendix A and B (Businessowners)
- Actuarial Support including Appendix A and B (Commercial Property)
- Actuarial Support including Appendix A and B (Farm)

Actuarial Support - Commercial Property

Introduction

ISO developed Windstorm Mitigation Credits for IBHS certification applicable to the Louisiana Commercial Property Basic Group II (BGII) loss costs, which covers the windstorm and hail perils, based on output from the AIR Hurricane Model and the Severe Thunderstorm Model. Both models provided expected losses, which varied by IBHS Certificate (Gold/FSL, Silver, Bronze/Roof, and No Certificate), Construction, and ZIP Code.

Development of Hurricane Mitigation Factor

Using output of the AIR Hurricane Model, we calculated Gold/FSL, Silver, and Bronze/Roof relativities by dividing the expected losses for the IBHS certificate levels by the expected losses for No Certificate for each ZIP Code and construction combination. We then averaged these relativities by rating territory, construction, and certificate level. Finally, we used ISO's Commercial Property Basic Group II experience data for Louisiana through 9/30/2020 to calculate construction ALCCL-weighted averages for each rating territory and Certificate level.

Hurricane Factor

	Territory				
IBHS Certificate	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Bronze/Roof	0.495	0.511	0.493	0.479	0.417
Silver	0.365	0.376	0.350	0.339	0.320
Gold/FSL	0.329	0.341	0.307	0.291	0.270

Because this factor should apply only to the hurricane portion of the policy loss costs, ISO adjusted the indicated model factors to reflect the portion of the total Basic Group II loss costs that were attributed to the Hurricane peril via the AIR modeled hurricane loss costs. This was calculated using Louisiana data for accident year ending 6/30/2020. The Hurricane Percentage by Territory is calculated as an ALCCL-weighted average of the Hurricane Percentage by Symbol and Coverage within each territory. For example, the Hurricane percentage for Symbol A in Zone 1 is 15.8% (0.012 / 0.076), from columns (6) and (7), respectively.

Territory	Hurricane %
Zone 1	25.9%
Zone 2	13.1%
Zone 3	65.3%
Zone 4	85.3%
Zone 5	88.3%

Development of Severe Thunderstorm Mitigation Factor

Using output of the AIR Severe Thunderstorm Model, we calculated Gold/FSL, Silver, and Bronze/Roof relativities by dividing the expected losses for the IBHS certificate levels by the expected losses for No Certificate for each ZIP Code and construction combination. We then averaged these relativities by rating territory, construction, and certificate level. Finally, we used Commercial Property Basic Group II experience data for Louisiana through 9/30/2020 to calculate construction ALCCL-weighted averages for each Certificate level.

Severe Thunderstorm Factor

	Territory				
IBHS Certificate	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Bronze/Roof	0.857	0.869	0.853	0.829	0.779
Silver	0.824	0.841	0.819	0.787	0.722
Gold/FSL	0.818	0.835	0.811	0.765	0.694

Because this relativity should apply only to the non-hurricane wind/hail portion of the policy loss costs, ISO adjusted the indicated model discounts to reflect the portion of the total Basic Group II non-hurricane losses that were attributed to wind/hail perils. The Non-Hurricane Wind/Hail percentage is derived from ISO's historical loss data for Louisiana through 9/30/2020. It is calculated as the [(10-year wind/hail non-hurricane losses / 10-year total non-hurricane losses) x (percentage of losses attributed to non-hurricane).

Territory	Non-H Wind/Hail %
Zone 1	66.0%
Zone 2	77.5%
Zone 3	30.9%
Zone 4	13.1%
Zone 5	10.4%

Development of Mitigation Factor for Other BGII Perils

Finally, a relativity of 1.00 was assigned to all other BGII perils, which we do not expect to vary by IBHS Certificate. The weight for this relativity is the complement of the weight given to both the hurricane and wind portion of the expected BGII losses.

Territory	Other %
Zone 1	8.1%
Zone 2	9.4%
Zone 3	3.8%
Zone 4	1.6%
Zone 5	1.3%

Final Calculation of Wind Mitigation Factors

Our final relativity is calculated by taking the weighted sum of the hurricane, severe thunderstorm, and other BGII loss factors.

For example, for Zone 1, the indicated hurricane factor for Bronze/Roof was 0.495 and the indicated severe thunderstorm factor was 0.857. The final factor is:

$$(0.495 * 0.259) + (0.857 * .660) + (1.00 * .081) = .77$$

The selected Wind Mitigation credits, which are the complement of the factors, are given below:

All Peril BGII Credits

	Territory				
IBHS Certificate	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Bronze/Roof	23%	17%	38%	47%	54%
Silver	28%	20%	48%	59%	63%
Gold/FSL	29%	21%	51%	64%	68%

APPENDIX A

AIR Worldwide Severe Thunderstorm Model

INTRODUCTION

The Louisiana Wind Mitigation Credits incorporates the use of a computerized severe thunderstorm model which can estimate severe thunderstorm losses more accurately and with greater geographic specificity than traditional experience-based techniques. The model uses a meteorological database of severe thunderstorms producing tornadoes, hailstorms and straight-line windstorms since 1955, a sophisticated data augmentation and smoothing technique, and engineering and insurance-based damage relationships to develop reliable estimates of expected losses. The model accounts for the probability of severe thunderstorms at a specific location, the intensity of wind speeds or the impact energy of hail at that location, and the relative damageability by type of structure.

The credits presented in this filing are based, in part, on Version 7.0.5 of AIR Worldwide's (AIR) Severe Thunderstorm Model for the United States. The model provides severe thunderstorm loss costs (expected severe thunderstorm losses per $100 of replacement cost value) by ZIP code, construction class, and building height.

DESCRIPTION OF THE SEVERE THUNDERSTORM MODEL

SEVERE THUNDERSTORM DEFINED

As defined by the National Weather Service (NWS), a severe thunderstorm is a storm which produces a tornado, winds of at least 58 mph (50 knots) and/or hail measuring a minimum of 0.75 inches in diameter. This definition was used in the development of the AIR severe thunderstorm model.

Tornadoes

Tornadoes are columns of air that rapidly rotate around a small area of low pressure. They often develop when heavy rainfall drags a downdraft to the ground, which brings with it rotating winds. As these winds touch the ground, a condensation funnel from the base of the cloud descends from a rotating wall cloud. When the vortex of a tornado extends to the ground, its circulation is marked by a funnel-shaped cloud of swirling dust and debris.

Tornadoes range from being stationary to having forward wind speeds up to 70 mph and have rotational wind speeds generally ranging from 40 mph to 110 mph, although sometimes up to 300 mph. Weaker tornadoes generally last about ten minutes and travel only short distances, while stronger tornadoes can last for several hours and can travel hundreds of miles.

Directly measuring tornado wind speeds by conventional methods is difficult, as the storms are usually small, brief, and occur out of range of anemometers. Also, instruments in a tornado's path are often destroyed by the wind intensity. Tornado intensity is classified by an indirect method based upon observed damage known as the Fujita scale, or F-scale, which was developed in 1971. In 2007, this scale was updated to the enhanced Fujita scale, or EF-scale (below), by a panel of experts who believed the original F-scale overestimated winds for tornadoes F-3 and higher.

The Enhanced Fujita Tornado Damage Scale

Scale	3 Second Gust (mph)	Potential Damage
EF0	65-85	Light damage to roofs, gutters, and siding. Tree branches broken. Confirmed storms with no reported damage are recorded as EF0.
EF1	86-110	Moderate damage to roofs. Mobile homes badly damaged. Exterior doors and windows lost. Glass broken.
EF2	111-135	Considerable damage to buildings. Roofs torn off well-constructed houses, foundations of frame homes shifted, and mobile homes completely destroyed. Large trees snapped or uprooted, light-object missiles generated, and cars lifted off the ground.
EF3	136-165	Severe damage to well-constructed homes and large buildings, trains overturned, and trees debarked. Heavy cars lifted off the ground and structures with weak foundations blown some distance.
EF4	166-200	Devastating damage to well-constructed houses, whole frame houses completely leveled. Cars thrown and small missiles generated.
EF5	Over 200	Incredible damage as strong frame houses leveled off foundations and automobile-sized missiles are airborne. Steel reinforced concrete structures badly damaged and high-rise buildings have significant structural deformation.

Hailstorms

Hailstones are supercooled liquid droplets that freeze after contact with condensation nuclei (such as an insect, dust particle, or ice crystal). Violent updrafts hold these particles aloft in the cloud. When air currents tilt, the droplets pass through varying levels of water content and develop coats of ice. The hailstones are lifted and dropped throughout the cloud repeatedly, each time accumulating another layer of ice. Once the particles grow too large and heavy to be supported by the rising air, they fall as hail.

Straight-Line Windstorms

The damage from straight-line winds can be as severe as that from a moderate to strong tornado and are often responsible for damage that is falsely attributed to tornadoes. Unlike tornadoes, a straight-line windstorm exhibits no circular motion because it lacks a central vortex. These events have wind speeds of more than 58 mph with maximum wind speeds that can exceed 100 mph.

Examples of straight-line wind events range from widespread events such as derechos or squall-line events to localized events such as downbursts, which occur when an area within a cumulonimbus cloud is cooled by evaporating rain or melting hail, becomes heavy, and begins to sink. These currents rapidly accelerate into the ground and then radiate from the impact area.

Straight-line wind is the most frequent of the three modeled perils (tornadoes, hail, and straight-line winds). Over the last twenty-five years, they are on average seven times more common than tornadoes and nearly one and a half times more common than hail events.

SEVERE THUNDERSTORM MODEL

The model consists of several components or modules - an event generation module, local intensity module, and damage estimation module.

The AIR Severe Thunderstorm Model for the United States captures the effects of hail, tornadoes, and straight-line windstorms (microevents) resulting from severe thunderstorms (macroevents) on properties in the U.S. A microevent is an individual tornado, hailstorm, or straight-line windstorm; a macroevent is a set or cluster of tornadoes, hailstorms, or straight-line windstorms occurring over the course of one or more days and resulting from the same atmospheric event or frontal system. A macroevent may include several hundred microevents. In the AIR model, however, a macroevent is considered a single occurrence.

The model contains a catalog of macro- and microevents that are based on a smoothed and augmented historical storm set which act as seed storms for the stochastic severe thunderstorm events.

Damage functions are then used to determine the relationship between the local intensity of each modeled type of event and the resulting damage to buildings and contents. Expected losses are calculated by applying the appropriate damage functions to the replacement value of the insured properties.

Following is a discussion of those elements reflected in the AIR severe thunderstorm model for the United States.

EVENT GENERATION MODULE

The following storm characteristics are modeled as part of the event generation model:

Frequency of Occurrence -- The model estimates the frequency of occurrence based on the severe thunderstorm database maintained by NOAA's SPC (Storm Prediction Center). This database includes information on more than 47,500 tornadoes, 212,000 hailstorms, and 241,000 straight-line windstorms from 1955 to the present. AIR scientists analyze geographical and temporal patterns in these microevents to identify clusters that comprise macroevents.

Microevents are significantly underreported in the historical data. No formal reporting system existed until the early 1970s, although numerous improvements have been made over time since then. To compensate for this underreporting, AIR scientists employ a combination of statistical smoothing and data augmentation techniques to get a more realistic assessment of the true occurrence rate of tornadoes, hailstorms, and straight-line windstorms.

Starting Location - The model estimates the probability of tornadoes, hailstorms, and straight-line windstorms starting at specific locations based on the smoothed and augmented historical database.

Storm-Track Direction - Storm-track direction is simulated using an empirical distribution based on historical data. Historically, tornadoes have generally followed a southwest to northeast path.

Storm Length and Width - The length and width of straight-line windstorms and hailstorms are generated by drawing values from a lognormal distribution. The length and width of tornado tracks are drawn from an empirical distribution derived from the historical database.

Storm Duration - The duration of simulated straight-line windstorms and hailstorms is estimated using a lognormal distribution based on the augmented and smoothed data; the duration of hailstorms is correlated with hailstone size. The model assumes constant wind speeds and hail intensity for the entire duration of straight-line windstorms and hailstorms, respectively. The duration of simulated tornadoes is not explicitly modeled.

Hailstone Size - The maximum size of a hailstone and variation within the hailstorm are determined based on empirical distributions derived from the historical databases.

Hailstone Rate - The number of hailstones per minute per unit area that strike an object depends on the hailstone density and velocity, wind conditions, and the orientation of the object's exposed surfaces.

Once the historical data are smoothed and augmented using the modeled storm variables above, the stochastic catalog is generated using these seed events. To simulate a potential future event, a historical event is picked at random and is spatially perturbed by offsetting the original latitude and longitude of each microevent within the storm. The process is repeated many times to produce a large stochastic catalog of potential, future severe thunderstorm events. The simulation approach has the advantage of reproducing the spatial frequency and seasonal variation in the geographic locations of each microevent. Note that the event catalog does not include macroevents for which the total estimated industry loss falls below $25 million.

LOCAL INTENSITY MODULE

For tornadoes and straight-line winds, local intensity is measured by wind speed; for hailstorms, it is measured by wind speed and hail impact energy.

Tornado Wind Speeds - The maximum wind speed is drawn from an exponential distribution whose mean is determined by the EF-scale value. Intensity varies linearly along the tornado track with the maximum wind speed occurring in the middle of the track and tapering off toward the beginning and end points of the track.

Straight-Line Wind Speeds - Wind speeds for straight-line windstorms are drawn from an exponential distribution fitted to the historical data. The parameters of the distribution are grid-dependent with a grid-cell size of one degree.

Hailstorm Wind Speeds - The damage resulting from hail depends not only on the size of the hailstones, but also on the wind speed that accompanies the storm. In light winds, most damage occurs on roofs; in strong winds hail also damages windows and siding. The wind speeds that accompany simulated hailstorms are drawn from an exponential distribution.

Hail Impact Energy - The energy with which a hailstone strikes an object determines the damage from hail storms. The hail impact energy contains a gravitational component, due to the falling weight of the hailstone, plus a wind component, due to propulsion of the hailstone by accompanying winds. Both are functions of the size (weight) of the hailstones, and the wind component increases with the wind speed.

DAMAGE ESTIMATION MODULE

Separate damage functions exist by peril (tornado, hail or straight-line wind), construction type (e.g., frame, joisted masonry, masonry non-combustible), occupancy and coverage (buildings vs. contents). Estimated damage is measured as the ratio of repair cost (i.e., expected losses) to the replacement cost of the property.

Damage Functions by Peril

Tornado damageability is modeled as a function of the fastest quarter-mile wind speed, which is the highest speed with which a quarter-mile of wind passes an observation point.

The severity of hail damage depends on the impact energy of hail, which in turn is a function of hailstone size and the accompanying wind speed. It is also a function of the spacing between hailstones (hailstone rate), the hailstorm area, and storm duration.

Damageability for straight-line windstorms is a function of 3-second gust speed and storm duration.

APPENDIX B

AIR Worldwide Hurricane Model

BASIC GROUP II

DESCRIPTION OF THE HURRICANE MODEL

HURRICANE DEFINED

A hurricane is a tropical cyclone technically defined as a non-frontal, low pressure synoptic-scale system in which the maximum sustained surface wind speed is at least 74 miles per hour.

HURRICANE MODEL

The model consists of several components or modules - an event generation module, local intensity module, and damage module.

The event generation module is used to create the stochastic storm catalog. Over 100 years of historical data on the frequency of hurricanes and their meteorological characteristics were used to fit statistical distributions for each parameter used. These parameters include storm track, landfall location and track angle at landfall, and the intensity variables of central pressure, radius of maximum winds, and forward speed. By stochastically drawing from these statistical distributions, the fundamental characteristics of each simulated storm are generated. The result is a large, representative catalog of potential events.

Once the model generates the characteristics of a simulated event, it propagates the event along its track. Peak gust wind speeds and wind duration are estimated for each geographical location affected by the storm, and the local intensity is estimated as a function of the magnitude of the event, distance from the source of the event, and a variety of local conditions.

Damageability functions are then used to determine the relationship between the local intensity and the resulting damage to buildings and contents. Expected hurricane losses are calculated by applying the appropriate damage functions to the replacement value of the insured properties.

Following is a discussion of those elements reflected in the AIR tropical cyclone model for the Gulf and Atlantic Coasts of the continental United States.

EVENT GENERATION MODULE

The following storm characteristics are modeled as part of the event generation module:

Frequency of Occurrence - The model estimates frequency of occurrence based on tropical cyclones occurring since 1900.

Landfall Location - The model estimates the probability of a hurricane occurring at points along the smoothed coastline from Texas to Maine.

Central Pressure - Central pressure is the primary determinant of hurricane wind speed and therefore of intensity. All else being equal, as central pressure decreases, wind speeds increase or, more precisely, wind speed is an increasing function of the difference between the central and peripheral pressure.

Radius of Maximum Winds (Rmax) - The radius of maximum winds is the distance from the storm's center, or eye, to where the strongest winds are found. On average, the radius of maximum winds tends to be larger at higher latitudes. Similarly, the radius will be smaller, on average, for more intense storms. These relationships are explicitly accounted for in the model. While a smaller radius of maximum winds corresponds to greater storm intensity, it does not necessarily follow that losses will be greater. This is because a smaller radius usually results in a smaller affected area.

Forward Speed - Forward, or translational, speed is the rate at which a hurricane moves from point to point along its track. In general, the higher the latitude, the faster the hurricane's translational speed. Faster moving storms result in higher losses further inland. On the other hand, the faster a storm travels, the shorter the duration that a building is subjected to high wind speeds. In some areas, particularly along the coast, this can lead to lower losses than would otherwise be the case.

Track Angle at Landfall - Separate distributions for track angle at landfall are estimated for segments of coastline that are variable in length, depending upon the coastal orientation of that segment.

Storm Track - Once landfall location and the track angle at landfall are identified, the simulated storm track is generated using conditional probability matrices which resemble the curving and recurving tracks actually observed from the stochastic storm database.

Multiple-Landfalling Storms - In order to model multiple landfalling events as single storms, simulated storm tracks are joined statistically based on consistency of certain storm parameters.

LOCAL INTENSITY MODULE

Once the model probabilistically generates the hurricane's meteorological characteristics, it simulates the storm's movement along its track. Calculations of local intensity begin with the maximum over-water windspeed, and then adjustments are made for the asymmetric nature of the hurricane windfield, storm filling over land, surface friction, and relative wind speed profiles.

Asymmetry Effect - In the Northern Hemisphere, hurricane winds rotate in a counter-clockwise direction. The combined effects of hurricane winds and forward motion produce higher wind speeds on the right side of the storm, as viewed facing the storm's forward direction. The model accounts for the dynamic interaction of the forward (translational) and rotational speeds, as well as the inflow angle.

Filling Effect - As the storm moves inland its intensity begins to dissipate. Central pressure rises and the eye of the hurricane begins to "fill" as it moves away from its energy source, i.e., warm ocean water. The model filling equations are a function of the geographic location (particularly distance form coastline) and the time elapsed since landfall. Rates of filling vary by region, consistent with historical observations.

Surface Friction Effect - Differences in surface terrain (or land use/land cover) also affect windspeeds. Wind velocity profiles typically show higher wind speeds at higher elevations. Winds travel more slowly at ground-level because of the horizontal drag force of the earth's surface, or surface friction. The addition of obstacles such as buildings will further degrade wind speed. In general, the rougher the terrain, due to both natural and man-made obstacles, the more quickly wind speeds dissipate.

Relative Wind Speeds - The wind speed at any particular location is dependent on the radial distance between the eye of the storm and the location of interest.

DAMAGE ESTIMATION MODULE

The tropical cyclone model develops a complete time profile of wind speeds for each location affected by the storm, thus capturing the effect of wind duration on structures as well as the effect of peak wind speed. Damage estimation for hurricanes begins at sustained wind speeds of 40 mph and is calculated cumulatively until sustained winds are once again below 40 mph.

Separate damageability estimates exist by construction type (e.g., frame, joisted masonry, masonry non-combustible) and coverage (buildings vs. contents). Estimated hurricane damage is measured as the ratio of repair cost (i.e., expected hurricane losses) to the replacement cost of the property, capped at 80% of the replacement cost. 80% replacement cost is the exposure base, or limit of insurance, used in ISO's commercial property program.

LOUISIANA
EXHIBIT C25
CALCULATION OF INDICATED BASIC GROUP II LOSS COSTS

TERR.	COVERAGE	SYMBOL	(1) ACC. YEAR ENDING 6/30/2020 BG II ALCCL	(2) CURRENT LOSS COST	(3) CURRENT NON-HURR LOSS COST	(4) STATEWIDE MONOLINE NON-HURR. CHANGE	(5) INDICATED NON-HURR. LOSS COST (3) * (4)	**(6)** HURRICANE MODELED LOSS COST	**(7)** INDICATED TOTAL LOSS COST (5) + (6)	(8) INDICATED PERCENT CHANGE (7)/(2)-1
Zone 1	BUILDINGS	A	14,758	0.068	0.055	1.156	0.064	0.012	0.076	11.8%
		AB	84,006	0.088	0.072	1.156	0.083	0.015	0.098	11.4%
		B	1,883,456	0.121	0.085	1.156	0.098	0.035	0.133	9.9%
	CONTENTS	A	1,994	0.065	0.055	1.156	0.064	0.010	0.074	13.8%
		AB	8,671	0.080	0.066	1.156	0.076	0.012	0.088	10.0%
		B	293,719	0.108	0.074	1.156	0.086	0.032	0.118	9.3%
	SUB-TOTAL		2,286,604							9.9%
Zone 2	BUILDINGS	A	28,622	0.068	0.062	1.156	0.072	0.006	0.078	14.7%
		AB	38,112	0.090	0.082	1.156	0.095	0.007	0.102	13.3%
		B	1,001,581	0.114	0.097	1.156	0.112	0.017	0.129	13.2%
	CONTENTS	A	6,092	0.068	0.062	1.156	0.072	0.005	0.077	13.2%
		AB	9,005	0.080	0.074	1.156	0.086	0.006	0.092	15.0%
		B	171,774	0.100	0.082	1.156	0.095	0.017	0.112	12.0%
	SUB-TOTAL		1,255,186							13.1%
Zone 3	BUILDINGS	A	7,223	0.094	0.042	1.156	0.049	0.051	0.100	6.4%
		AB	59,835	0.122	0.056	1.156	0.065	0.066	0.131	7.4%
		B	2,054,767	0.210	0.066	1.156	0.076	0.144	0.220	4.8%
	CONTENTS	A	3,294	0.082	0.041	1.156	0.047	0.040	0.087	6.1%
		AB	6,062	0.104	0.048	1.156	0.055	0.054	0.109	4.8%
		B	395,799	0.187	0.054	1.156	0.062	0.128	0.190	1.6%
	SUB-TOTAL		2,526,980							4.4%
Zone 4	BUILDINGS	A	37,278	0.155	0.031	1.156	0.036	0.124	0.160	3.2%
		AB	85,152	0.200	0.040	1.156	0.046	0.161	0.207	3.5%
		B	2,742,460	0.361	0.046	1.156	0.053	0.316	0.369	2.2%
	CONTENTS	A	15,956	0.120	0.027	1.156	0.031	0.092	0.123	2.5%
		AB	29,721	0.157	0.033	1.156	0.038	0.123	0.161	2.5%
		B	651,701	0.305	0.037	1.156	0.043	0.265	0.308	1.0%
	SUB-TOTAL		3,562,268							2.0%
Zone 5	BUILDINGS	A	0	0.313	0.044	1.156	0.051	0.262	0.313	0.0%
		AB	0	0.402	0.056	1.156	0.065	0.339	0.404	0.5%
		B	944	0.691	0.066	1.156	0.076	0.616	0.692	0.1%
	CONTENTS	A	0	0.236	0.050	1.156	0.058	0.176	0.234	-0.8%
		AB	30	0.301	0.060	1.156	0.069	0.232	0.301	0.0%
		B	114	0.556	0.068	1.156	0.079	0.467	0.546	-1.8%
	SUB-TOTAL		1,088							-0.1%

DIVISION FIVE – FIRE AND ALLIED LINES

70. CAUSES OF LOSS – BASIC FORM

***

The following is added to Paragraph **E.:**

3. Windstorm Construction Program

a. Introduction

With respect to all single-family residential properties and commercial properties, insurers shall provide for premium discounts, credits or other adjustments to reduce premiums when an insured builds or retrofits a structure to resist loss due to hurricane, tornado or other catastrophic windstorm events in compliance with the requirements of the Insurance Institute for Business & Home Safety (IBHS®).

b. Eligibility

Insurable properties, including single-family residential properties and commercial properties, are eligible for credit if the property has been certified as constructed in accordance with the Fortified Home™ or Fortified Commercial™ program promulgated by the IBHS®. The credit or discount shall apply only to policies that provide wind coverage and does not apply if the insured elects to exclude coverage for Wind and Hail losses through Windstorm Or Hail Exclusion – Direct Damage Endorsement **CP 10 53.**

c. Proof Of Compliance

The following applies to property eligible for the IBHS® Fortified Home™ or Fortified Commercial™ program:

(1) An insurable property shall be certified as constructed in accordance with the Fortified Home or Fortified Commercial standards only after inspection and certification by an IBHS® certified inspector.

(2) An owner of insurable property claiming a credit or discount shall maintain and provide certification records and construction records, including certification of compliance with the IBHS® standards, for which the owner seeks a discount. Such documents may include but are not limited to receipts for contractors, receipts for materials, and records from local building officials. The IBHS® certification documents shall be considered evidence of compliance with the Fortified Home or Fortified Commercial standards. The certification shall be presented to the insurer or potential insurer of a property owner before the adjustment becomes effective for the insurable property along with any other necessary records.

(3) The credit will only apply for five years from the date of the designation. In order to continue receiving the mitigation credit after five years, the property must be re-inspected and re-designated by the IBHS®. If the IBHS® designation expires, the applicable mitigation credit will expire upon renewal.

d. Wind Mitigation Discount Procedure

Use state Table **70.E.3.d.** to determine the Windstorm Loss Mitigation Credit for the applicable certificate level for the risk. The credit applies to the rate or premium for Basic Group **II** coverage on the building and its contents:

	IBHS FORTIFIED Home Or Commercial Certificate Level		
Territory	**Bronze/Roof**	**Silver**	**Gold/FSL**
Zone 1	23 %	28 %	29 %
Zone 2	16	20	21
Zone 3	38	48	51
Zone 4	47	59	64
Zone 5	54	63	68

Table 70.E.3.d. Windstorm Loss Mitigation Credits

e. Building Code Effectiveness Grading

If a premium credit under Paragraph **E.3.** applies to the risk, the Basic Group **II** factor in Additional Rule **A1.** does not apply.

f. Windstorm Loss Mitigation – Midterm Installation

When mitigation measures are installed midterm, premium adjustment is required on a pro rata basis.