

FPHLM VERSION HISTORY

CHECKLIST OF CHANGES FROM VERSION 2.0 TO VERSION 2.5

1. Fortran code (stormgen.f) has been modified as follows:

- Updated to reflect the changes of the Rmax model
- Added with comments
- Performed unit testing and regression testing
- Updated the corresponding chapters in the Primary Document and Testing Document

2. IDL Code (Rmax solution) has been modified as follows:

- Updated to reflect the changes of the Rmax model, Holland B parameter, and the filtering threshold
- Added with comments
- Performed unit testing and regression testing
- Updated the corresponding chapters in the Primary Document and Testing Document

3. ILM program has been modified as follows:

- Updated the approach of applying the demand surge factors: from one factor for all types of losses to one factor to each type of losses.
- Added with comments
- Performed unit testing and regression testing
- Updated the corresponding chapters in the Primary Document and Testing Document

4. CVS has been setup for Version 2.5

5. 10600-year simulation has been performed with Standard S4 generated

6. Based on S4 results of the 10600-year run S4 results, the following tasks have been done:

- Performed 61000-year simulation
- Re-ran all the related forms and maps for the submission purpos

7. Updated Submission Document

8. Updated the Line counts for the updated codes

CHECKLIST OF CHANGES FROM VERSION 2.5 TO VERSION 2.6

1. Fortran code (STG) has been modified as follows:

- Developed new version of Fortran code, named HIC (Historical Initial Condition) together with AHO and SGT embedded
- Online web program has been modified to provide the option of HIC
- Performed unit testing and regression testing
- Added modification history and comment to the header
- Updated the corresponding chapter in Primary Document
- Updated the corresponding chapter in Testing Document

2. WSC program has been modified as follow:

- Developed Java-based WSC program to support parallel processing
- New roughness data has been uploaded into Oracle database to be used by the WSC program
- Wind speed conversion factor (m/s to mph) has been modified from 2.24 to 2.2369
- Performed unit testing and regression testing
- Added modification history and comment to the header
- Updated the corresponding chapter in the Primary Document
- Updated the corresponding chapter in the Testing Document

3. WSP program has been modified as follow:

- Modified WSP program to support parallel processing
- Modified to include more decimal places (from 3 to 6 digits)
- Performed unit testing and regression testing
- Added modification history and comment to the header
- Updated the corresponding chapter in Primary Document
- Updated the corresponding chapter in Testing Document

4. Vulnerability program (Age_Weighted_Program.m) has been changed as follows:

- Weight factors statistics change due to the addition of the AllState data
- Mix for the weak and medium weights was changed for the central and north regions
- Allocation of the age groups was modified for the Keys
- Average of the statistics for both Frame and Masonry in the North, to resolve the problem having lower Frame losses than Masonry losses
- Performed unit testing and regression testing
- Added modification history and comment to the header
- Updated the corresponding chapter in Primary Document
- Updated the corresponding chapter in Testing Document

5. ILM program has been modified as follows:

- Used new Age-weighted vulnerability matrices
- Used new combined mobile home matrices, using the following weights:

Region	zone2 pre94 weight	zone3 pre94 weight
Central	0.81	0.85
Keys	0	0.85
North	0.58	0.56
South	0.85	0.85

- Used new demand surge factors
- Performed unit testing and regression testing
- Added modification history and comment to the header
- Updated the corresponding chapter in Primary Document
- Updated the corresponding chapter in Testing Document

6. 10600-year and 50000-year simulations have been performed

7. Based on S4 results of the 10600-year run, the following tasks have been done:

- Performed 50000-year simulation
- Re-ran all the related forms and maps for the submission purpose

8. Updated Submission Document

9. Updated the Line counts for the updated codes

10. Used the new and consistent naming convention among different groups

- Updated the corresponding chapter in Primary Document
- Updated the corresponding chapter in Testing Document

11. CVS has been setup for Version 2.6

CHECKLIST OF CHANGES FROM VERSION 2.6 TO VERSION 2.7

1. Documentation of StormTrack Model has been updated as follows:

- Updated the corresponding chapter in the Primary Binder with description of Pressure Decay and Threat Area
- Updated the corresponding chapter in the Primary Binder with a glossary table that maps variables in the code to equations in the documentation

2. Documentation of Wind Speed Correction (WSC) has been updated as follows:

- Updated the corresponding chapter in the Primary Binder with a glossary table that maps variables in the code to equations in the documentation
- Updated the roughness section in the Primary Binder with more description and flowchart and class diagrams
- Added testing of roughness program in the Testing Report

3. Documentation of Wind Speed Probability (WSP) has been updated as follows:

- Updated corresponding chapter in the Primary Binder with a glossary table that maps variables in the code to equations in the documentation

4. Documentation of Monte Carlo Simulation has been updated as follows:

- Updated corresponding chapter in the Primary Binder with a glossary table that maps variables in the code to algorithms in the documentation

5. Documentation of Vulnerability and Fragility for Residential and Manufactured Homes (VFRMH) component has been updated as follows:

- Updated the corresponding chapter in the Primary Binder with a glossary table that maps variables in the code to equations in the documentation

6. Insurance Loss Module has been modified as follows:

- Incorporated exceptions in the program code to handle abnormal conditions

- Change variables that hold losses values from double to long double
- Modified statements that test the existence of files to use a function provided by boost library
- Modified PILM program to output losses with more decimal points
- Calculated new regional-weighted demand surge factors for PILM because of the new stochastic storm set
- Updated the code that creates the hypothetical exposures files of forms A6A and A6B to apply the percentage deductibles to Contents Limit for Condominium-Owner policies and print out the ZIP Codes of A6A.C and A6A.D (same for A6B)
- Added modification history and comments to the program codes
- Performed unit, aggregation, and regression testing
- Updated corresponding chapter in the Testing Report
- Updated the class diagrams in the Primary Binder
- Added glossary tables in the Primary Binder that map variables in the code to equations and algorithms in the documentation
- Updated the line counts table in the Primary Binder

7. Migrated Form M1's code from C to C++ and modified it to include the approaches of counting storm landfalls of the 2006 ROA and 2007 ROA

- Updated section in Testing Report

8. Updated the Oracle database with latest HURDATA data which covers the storms of 2006

9. Performed 10,600-year and 50,000-year simulations

10. Based on Standard S4 results of 10,600-year run, the following tasks have been carried out:

- Performed 50,000-year simulation
- Re-ran all related forms and maps for submission purposes

11. Included six more runs in the validation results

12. Updated submission document

13. Updated the Primary Binder with the rules underlying the model version and numbering system

14. Setup CVS for Version V2.7

CHECKLIST OF CHANGES FROM VERSION 2.7 TO VERSION 3.0

1. Storm Track Model has been updated as follows:

- Incorporated water depth in intensity changes
- Modified threat area definition
- Changed minimum pressure for storm initiation to 1005 mb
- Updated the corresponding chapter in the Primary Binder with new description for Threat Area, Initial Conditions, Storm Motion and Intensity Change
- Updated the corresponding chapter in the Primary Binder with a glossary table that maps variables in the code to the two new equations that describe storms motion
- Updated testing report

5. Vulnerability and Fragility for Residential and Manufactured Homes (VFRMH) component has been updated as follows:

- Updated one MATLAB file to fix the weights for creating the aged-weighted matrices
- Updated accordingly the Primary Binder
- Performed testing for the new MATAB file

6. Insurance Loss Module has been modified as follows:

- Updated the MATLAB code that converts vulnerability matrices from MAT to CSV format with the dlmwrite function to avoid rounding errors in the conversion
- Updated Testing Report
- Created new MATLAB and Java programs for checking the vulnerability matrices
- Added the documentation in the Primary Binder
- Updated accordingly the testing report and user manual

9. Performed 10,700-year and 53,500-year simulations

10. Based on Standard S4 results of 10,600-year run, the following tasks have been carried out:

- Performed 53,500-year simulation
- Re-ran all related forms and maps for submission purposes

11. Updated validation results

- Reprocessed validation data
- Processed new validation data

12. Updated submission document

13. Updated the Primary Binder with the rules underlying the model version and numbering system

14. Updated the Count Code Table for STG code and added new Code-Count tables for the MATLAB and Java programs for matrix checking

15. Setup CVS for Version V3.0

CHECKLIST OF CHANGES FROM VERSION 3.0 TO VERSION 3.1

1. Acquired new ZIP code set from MapInfo with USPS vintage of July 2008

2. Updated the Oracle database with latest HURDATA data which covers the storms up to 2007

3. Wind Field Module has been updated as follows:

- Updated IDL code to include the new 2008 ZIP code set
- Performed regression testing to IDL
- Updated roughness table due to new ZIP codes and stored updated table in Oracle database

4. Updated storm base set due to reanalysis in the HURDAT data

- Rerun IDL and WSC on the base set due to corrections, new ZIP code set, and new roughness values

5. Vulnerability and Fragility for Residential and Manufactured Homes (VFRMH) component has been updated as follows:

- Updated vulnerability code due to slight modification of leak model
- Updated accordingly the Primary Binder
- Performed unit and aggregation testing for Vulnerability_Prog_011209.m and Manufac_Homes_Prog_0113091.m

6. Form codes have been modified as follows:

- Created new Form A5 which provides percentage of losses for 2004 hurricane season (Charley, Frances, Ivan, and Jeanne)
- Created new Form A9 Part A which provides expected annual losses and return periods for different loss ranges based on annual losses

- Created new Form A9 Part B which provides estimated loss and uncertainty intervals for different return periods
- Updated Form M1 to count the most intense landfall of a storm
- Updated Form M2 to read from a parameter file any desired return period for which maximum winds are calculated
- Updated forms V2 and V3 due to two new mitigation measures: membrane and metal roof
- Updated accordingly the testing report and user manual

7. Performed 10,800-year and 54,000-year simulations

8. Calculated new demand surge factors for PILM based on the new simulation

9. Based on Standard S4 results of 10,800-year run, the following tasks have been carried out:

- Performed 54,000-year simulation
- Re-ran all related forms and maps for submission purposes

10. Updated validation results

- Split three validation data files into residential and manufactured and rerun validation

11. Updated submission document

12. Updated the “Model Revision and Maintenance Policy” section of the primary binder to list the changes in the model that caused a new model version number

13. Added a new section “Model Revision” in the primary binder which maintains the tables required in standard C1.C and C6.D

14. Updated the Count Code Tables

15. Setup CVS for Version V3.1

CHECKLIST OF CHANGES FROM VERSION 3.1 TO VERSION 4.0

1. Slight modification of the wind field code to output more data (storm location, speed, and direction in 1-hour snapshots)

2. A new methodology for treating surface friction:

- New code for wind speed correction use case
- Updated requirements documentation and computer model design in primary binder
- Corresponding testing was performed
- Test Report was updated

3. Updates in the Engineering component:

3.1 New statistics of building population from new exposure survey

3.2 Leak model for Central and North Timber vulnerabilities adjusted

3.3 New variants of weak and medium masonry and timber site-built homes

3.4 New nomenclature for vulnerability matrices:

- New engineering codes
- Updated requirements documentation and computer model design in primary binder
- Corresponding testing was performed
- Test Report was updated

4. New Commercial Residential model:

- New engineering code for commercial residential buildings
- New insurance loss model for commercial residential policies
- Updated requirements documentation and computer model design in primary binder
- Corresponding testing was performed
- Test Report was updated

5. New capability to model losses at the “street level”:

- Geocoding use case was created
- Capability for estimating losses at the street level stems from the ability of the wind speed correction use case to compute the winds at the street level
- Corresponding testing was performed
- Test Report was updated

6. New HURDAT database:

- Updated the Oracle database with latest HURDATA data which covers the storms of 2008

7. Acquired new ZIP code set from MapInfo with USPS vintage of December 2009:

- Data verification by expert

8. Form codes have been modified to include changes in wind speed correction and engineering component:

- Updated form requirement documentation
- Corresponding testing was performed
- Test Report was updated

9. Based on Standard S4 results of 11,000-year run, the following tasks have been carried out:

- Performed 55,000-year simulation
- Re-ran all related forms and maps for submission purposes

10. Updated validation results and included commercial residential validation

11. Updated submission document

12. Updated the “Model Revision and Maintenance Policy” section of the primary binder to list the changes in the model that caused a new model version number

13. Updated the Count Code Tables

14. Setup SVN for Version V4.0

CHECKLIST OF CHANGES FROM VERSION 4.0 TO VERSION 4.1

1. Modification of the rain estimation in the commercial residential component

- Updated the rain estimation in the low-rise vulnerability model
- Modified the water intrusion module of the ILM for high-rise buildings
- Updated requirements documentation and computer model design in the primary binder
- Corresponding testing was performed
- Test report was updated

2. Incorporation of time related expenses (TRE) in the ILM for low-rise commercial residential buildings

- Incorporated TRE in the loss computation of the ILM for low-rise commercial residential buildings
- Updated requirements documentation and computer model design in the primary binder
- Corresponding testing was performed
- Test report was updated

3. Updated commercial residential validation results

4. Re-ran all forms and maps related to the commercial residential model

5. Updated submission document

6. Updated the “Model Revision and Maintenance Policy” section of the primary binder to list the changes in the model that caused a new model version number

7. Updated the Count Code Tables

8. Setup SVN for Version V4.1

CHECKLIST OF CHANGES FROM VERSION 4.1 TO VERSION 5.0

1. Changes in the Personal Residential Model:

- Addition of metal roof and metal shutters for all strength models.
- Increase of window capacities for strong models, new nomenclature for vulnerability matrices, and implementation of gradation of strong models.
- Change of life cycle duration for roof replacement from 20 to 30 years
- Consolidation of the footprint options for the physical damage model into a single timber frame and single masonry footprint.
- Updated the matrix selection process in the personal residential model.
- Updated requirements documentation and computer model design in the primary document binder.
- Update the code count table for the personal residential model in the primary document binder.
- Corresponding testing was performed.
- Test report was updated.

2. Changes in the Low Rise Commercial Residential Model:

- Addition of soffit, metal shutters, and metal roof.
- Modification of the following items:
 - debris impact model
 - roof to wall failure connection algorithm
 - window protection in the presence of metal shutters
 - rain adjustment factors, wind speed variation with height in rain model
 - costing scheme
 - wall sheathing capacities
 - window capacities for strong models
 - pressure coefficients c_p for hip roof models
 - relationship between ASCE vs. modeled pressure coefficients c_p
 - roof to wall connection capacities
 - masonry wall capacity.

- Updated requirements documentation and computer model design in the primary document binder.
- Corresponding testing was performed.
- Test report was updated.

3. Changes in the Mid-/High-Rise Commercial Residential Model:

- Addition of debris impact zones, of the option of no sliders and of the differentiation between damaged and breached openings.
- Modification of the external damage costing scheme, the opening pressure capacities, the interior damage cost coefficient, and the number of windows in open layout.
- Updated the vulnerability and breach curves selection process to implement the new debris impact zones and the option of no sliders.
- Updated exterior damage and interior damage modules, computation of the interior damage cost coefficient, and the number of windows in open layout.
- Updated requirements documentation, computer model design, and detailed design and implementation of ILM-CR in the primary document binder.
- Updated the code count table for the mid-/high-rise commercial residential model in the primary document binder.
- Corresponding testing was performed.
- Test report was updated.

4. Update of HURDAT

- Updated section 6.1 in the primary document binder to reflect the years covered by the new HURDAT.

5. Modification of the hurricane marine PBL height in terrain conversion model.

- Updated section “Wind Speed Correction” in the primary document binder.
- Corresponding testing was performed.
- Test report was updated.

6. Update of probability distribution function in the Storm Track Generator.

- Updated section “Technical Description of the Storm Track Model” of the primary document binder.

7. Update of wind-borne debris region boundaries.

- Updated selection process of wind-borne debris matrices in the personal residential and low rise commercial residential models.
- Corresponding testing was performed.
- Test report was updated.

8. Processed 2004 and 2005 personal and commercial residential data through the model for validation purposes.

9. Updated the submission document to address some of the points of the deficiencies letter.

10. Updated the “Model Revision and Maintenance Policy” section of the primary document binder to list the changes in the model that caused a new model version number.

11. Updated the Count Code Tables in the primary document binder.

12. Set up SVN for version 5.0.

CHECKLIST OF CHANGES FROM VERSION 5.0 TO VERSION 6.0

1. Changes in the Low-Rise Commercial Residential Model:

- Projectile count increase in debris impact model.
- Interior pressure sharing between attic and top floor changed.
- Interior pressure calculation in the attic space due to sheathing loss changed.
- Change in the soffit damage computation.
- Reductions in the pressure coefficient (C_p) multiplier.
- Modification of the masonry wall area failure function and its differentiation between unreinforced and reinforced masonry.
- Changes in the rain admittance factor (RAF) values and incorporation of the new surface run-off coefficient.
- Replacement of the directionality factor (f_{sim}) with a more sophisticated directionality scheme.
- The statistics used to weigh the low-rise CR vulnerability matrices were updated.

2. Changes in the Mid-/High-Rise Commercial Residential Model:

- An additional volume of water penetration was modeled at the upper story of Mid/high-rise CR model.
- Updated requirements documentation, computer model design, and detailed design and implementation of ILM-CR in the primary document.
- Updated the code count table for the mid-/high-rise commercial residential model in the primary document.
- Corresponding testing was performed.
- Test report was updated.

3. Update of HURDAT2.

- Updated to a recent version of HURDAT2 (4/1/2014), which includes storms up through the 2013 season.
- Updated Volume V and section "General Description of Storm Track Model" of Volume II in the primary document.

4. Update of the Land Use/Land Cover data set.

- Updated the land use/land cover data set using MRLC NLCD 2011 and the Statewide 2004-2011 Florida Water Management District data set. Updated terrain roughness.
- Updated section "FPHLM Roughness Classification" of Volume II of the primary document.

5. Update of the ZIP Code Database.

- Updated the ZIP Code database to the December 2013 ZIP Code boundaries. Updated ZIP Code centroid locations.
- Updated section "FPHLM Roughness Classification" of Volume II of the primary document.

6. Revision of Rmax Database.

- The Rmax database was revised to include recent storms and revisions to historical storms.
- Updated section "Rmax Model" of Volume II of primary document.

7. Run the 2004 and 2005 personal and commercial residential data through the model for validation purposes.

8. Addition of the verification approaches used for externally acquired data to the Data Verification section of Volume VI of the primary document in accordance with the new disclosure item #3 of Standard C-5.

9. Addition of the diagrams illustrating model-related flow of information and its processing by modeling organization personnel or team to the "Model-related Flow of Information" section of Volume I of the primary document in accordance with the new audit item 1.e of Standard C-3.

10. Updated the “Model Revision and Maintenance Policy” section of Volume VI of the primary document to list the changes in the model that caused a new model identification number.

11. Updated the Count Code Tables in Volume VI of the primary document.

12. Updated the submission document to address the points of the deficiencies letter.

CHECKLIST OF CHANGES FROM VERSION 6.0 TO VERSION 6.1

1. Changes in the Low-Rise Commercial Residential Model:

- Modeling of gable end damage for masonry models.
- Further modification of the masonry wall area failure function and its differentiation between unreinforced and reinforced masonry.
- Rain penetration model: correction to the dimension of gable end upstream run-off area ASR.
- Alternative soffit model.

2. Re-generated all forms and maps related to the low-rise commercial residential model.

3. Updated the submission document.

4. Re-ran the 2004 and 2005 low-rise commercial residential validation data for validation purposes.

5. Updated the “Model Revision and Maintenance Policy” section of Volume VI of the primary document to list the changes in the model that caused a new model identification number.

CHECKLIST OF CHANGES FROM VERSION 6.1 TO VERSION 6.2

1. Changes in the Low-Rise Commercial Residential Model.

- Calculation of soffit areas of hip and gable roof buildings.
- Update of exposure statistics, leading to changes in the weighted matrices.
- Correction in the handling of WDR2.
- Removal of rain sampling bounds.

2. Changes in the Personal Residential Model.

- Update of exposure statistics, leading to changes in the weighted matrices.

3. Update of HURDAT2.

- We updated to a recent version of HURDAT2 (2/17/2016) which includes storms up through the 2015 season.
- Updated Volume V and section "General Description of Storm Track Model" of Volume II in the primary document.

4. Update of the ZIP Code Database.

- We updated the ZIP Code database to the March, 2015 ZIP Code boundaries as per Standard G-3.
- Updated section "FPHLM Roughness Classification" of Volume II of the primary document.

5. Updated the "Model Revision and Maintenance Policy" section of Volume VI of the primary document to list the changes in the model that triggered a new model identification number.

6. Ran the 2004 and 2005 personal and commercial residential data for the validation of the model.

7. Updated the submission document to address items in the deficiency letter.