Monte Carlo Simulation Model for Commercial Residential Buildings (MCS-CRB) Use Case II Glossary

Glossary

MCS-LB

ENCLOSURECONDITIONUPDATER_GABLE.m

Input Variables	Description	Terms in Documentation
direction i	a scalar describing the wind's direction of approach, it can be any integer between 1 and 8. A cornering wind is denoted by 2, 4, 6 or 8, wind hitting the short side of the building is denoted by 3 or 7, while wind hitting the building's long side is denoted by 1 or 5.	Enclosure Condition: the condition that describes the area of openings within a given building. For this model the enclosure condition is computed for every story and for the attic. The enclosure condition affects the internal pressure of the building and as a result the load intensities can change.
RoofType	a string array describing the geometry of the roof, it can be 'Gable' or 'Hip'	
RoofSlope	a string array describing the geometry of the	

	roof, it can be 'Gable' or 'Hip'.
EaveHeight	a scalar describing the height of the roof at the eave in feet.
LengthFLR	a scalar describing the building's re-assigned floor plan length in feet.
WidthFLR	a scalar describing the building's re-assigned floor plan width in feet.
TotalNumberofStories	a scalar describing the total number of stories present in a building.
EnclosureConditionAttic	a string array containing an initial condition for the enclosure condition of the attic; it can be 'E', 'P', or 'O'.
EnclosureConditionAllFloors	a matrix (rows = TotalNumberofStories, cols = 1), containing the enclosure

	condition ('E', 'P', or 'O') for every story.	
Component Area Maps	matrices containing the area occupied by a component in a location of a wall mapped by the matrix indexes (matrix size = # of stories by # of wall sheathing panels on that wall).	Enclosure Condition: the condition that describes the area of openings within a given building. For this model the enclosure condition is computed for every story and for the attic. The enclosure condition affects the internal pressure of the building and as a result the load intensities can change.
Component Damage Mappers	matrices identifying the damage of particular components for a given wall (matrix size = # of stories by # of wall sheathing panels on that wall). A 1 denotes a damaged component while a 0 denotes an undamaged one.	
External Pressure Coefficient Possibilities	scalars determined in accordance with ASCE 7-05, they are function of the wind effective area of the building and the approach	

	direction of the wind.
Failure_Ident_Sheathing	Matrix = Identifies the sheathing panels that have failed with a value of 1.
Failure_Load_Sheathing	Matrix = The averaged pressure load on each sheathing panel, taking
Area_of_Sheathing	a matrix comprising the area of each sheathing panel on the roof
External Pressure Coefficients	a matrix containing the weighted external pressure coefficients for every sheathing panel in a given floor (matrix size = 1 by # of wall sheathing panels on that wall).

Output Variables

GCpi	A vector whose length is equal to the number of floors of the building. The internal pressure is determined by the opening

	created by wall sheathing and window damages.
GCpi_Attic	A scalar indicating the internal pressure of the attic space.

ENCLOSURECONDITIONUPDATER_HIP.m

Input Variables	Description	Terms in Documentation
direction i	a scalar describing the wind's direction of approach, it can be any integer between 1 and 8. A cornering wind is denoted by 2, 4, 6 or 8, wind hitting the short side of the building is denoted by 3 or 7, while wind hitting the building's long side is denoted by 1 or 5.	Enclosure Condition: the condition that describes the area of openings within a given building. For this model the enclosure condition is computed for every story and for the attic. The enclosure condition affects the internal pressure of the building and as a result the load intensities can change.
Failure_Ident_Sheathing_Hip_#	Matrix = Identifies the sheathing panels that have failed with a value of 1. (# = 1	

	or 2 is used in the identification of the particular Hip Region)
Failure_Ident_Sheathing_Main_#	Matrix = Identifies the sheathing panels that have failed with a value of 1. (# = 1 or 2 is used in the identification of the particular Main Roof Region)
Failure_Load_Sheathing_Hip_#	Matrix = The averaged pressure load on each sheathing panel, taking into consideration the contribution of each zone for each panel and their corresponding pressure loading (# = 1 or 2 is used in the identification of the particular Hip Region)
Failure_Load_Sheathing_Main_#	Matrix = The averaged pressure load on each sheathing panel, taking into consideration

	the contribution of each zone for each panel and their corresponding pressure loading (# = 1 or 2 is used in the identification of the particular Main Roof Region)	
Areas	Matrix = Matrix identifying the total area of each sheathing panel on the Main Roof Regions. Units are ft^2	
Areas_Hip	Matrix = Matrix identifying the total area of each sheathing panel on the Hip Regions. Units are ft^2	
RoofType	a string array describing the geometry of the roof, it can be 'Gable' or 'Hip'.	
RoofSlope	a scalar describing the roof slope	Enclosure Condition: the condition that describes the area of openings within a given building. For this

EaveHeight	a scalar describing the height of the roof at the eave in feet.	model the enclosure condition is computed for every story and for the attic. The enclosure condition affects the internal pressure of the building and as a result the load intensities can change.
LengthFLR	a scalar describing the building's re-assigned floor plan length in feet.	
WidthFLR	a scalar describing the building's re-assigned floor plan width in feet.	
TotalNumberofStories	a scalar describing the total number of stories present in a building.	
Enclosure Condition Attic	a string array containing an initial condition for the enclosure condition of the attic; it can be 'E', 'P', or 'O'.	
Enclosure Condition AllFloors	a matrix (rows = TotalNumberofStories, cols = 1), containing the enclosure condition ('E', 'P', or 'O') for every story.	

Component Area Maps	matrices containing the area occupied by a component in a location of a wall mapped by the matrix indexes (matrix size = # of stories by # of wall sheathing panels on that wall).	
Component Damage Mappers	matrices identifying the damage of particular components for a given wall (matrix size = # of stories by # of wall sheathing panels on that wall). A 1 denotes a damaged component while a 0 denotes an undamaged one.	
External Pressure Coefficient Possibilities	scalars determined in accordance with ASCE 7-05, they are function of the wind effective area of the building and the approach direction of the	Enclosure Condition: the condition that describes the area of openings within a given building. For this model the enclosure condition is

	wind.	computed for every story and for the attic. The enclosure condition affects the internal pressure of the building and as a result the load intensities can change.
Failure_Ident_Sheathing	Matrix = Identifies the sheathing panels that have failed with a value of 1.	
Failure_Load_Sheathing	Matrix = The averaged pressure load on each sheathing panel, taking into consideration the contribution of each zone for each panel and their corresponding pressure loading.	
Area_of_Sheathing	= a matrix comprising the area of each sheathing panel on the roof	
External Pressure Coefficients	a matrix containing the weighted external pressure coefficients for every sheathing panel in a given floor (matrix size = 1 by # of wall sheathing panels on that wall).	

Output Variables

GCpi	A vector whose length is equal to the number of floors of the building. The internal pressure is determined by the opening created by wall sheathing and window damages.
GCpi_Attic	A scalar indicating the internal pressure of the attic space.

*Model_Control.m

R2W_Capacity_Gable.m

Input Variables	Description	Terms in Documentation
rating	scalar = Indicates the strength rating of the components: 1 (weak), 2 (medium), and 3 (strong)	Roof sheathing: The 4x8 ft plywood panels that are attached to the roof trusses and provide a mounting system for the roof cover.
Number_of _Trusses_ Row	scalar = Indicates the number of r2w connections along the eave of the roof.	

Output Variables

r2w_cap	Matrix contains the randomly assigned capacity of each of the r2w connection. The size of the matrix depends on the number of trusses and is equal to 2 by Number_of_Trusses_Row (one row for each roof face). Units are lbs.
mean_resist	A scalar value representing the mean resistance of the r2w connection after the FS is applied.

R2W_Capacity_Hip.m

Input Variables	Description	Terms in Documentation
rating	scalar = Indicates the strength rating of the components: 1 (weak), 2 (medium), and 3 (strong). Variable is used to select the mean capacity of the roof components.	