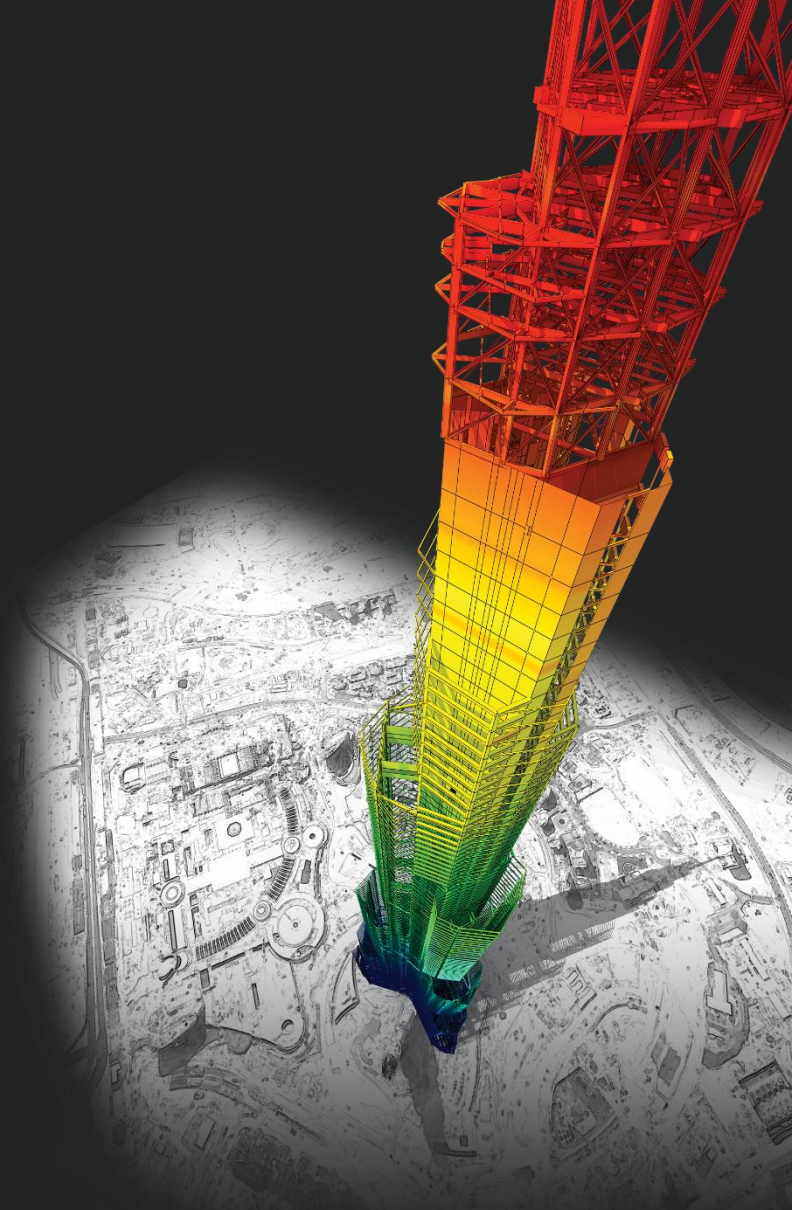


Release Note

Release Date : July. 2023

Product Ver. : midas Gen 2023 (v2.1)



DESIGN OF General Structures

Integrated Design System for Building and General Structures

Enhancements

- **midas Gen**

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*) Appendix Guide to Input User Type Seismic Load		
*) Appendix Guide to Export Pushover Hinge for Inelastic Hinge Properties		

midas **Gen**

1. User Type Seismic Load

Added New Function Static Seismic Load: "User Type"

Load Case Name : EX

Seismic Load Code : IBC2012(ASCE7-10)

Description : IBC2000(ASCE7-98)
UBC(1997)

Seismic Load Parameter:
Design Spectral Respo:
Site Class : D

Ss : 0.75 Fa
S1 : 0.3 Fv

Period Coef. (Cu)

Risk Category

Seis. Design Category : Korea(Arch.2000)
Korea(Arch.1992)

Structural Parameters
China(GB50011-2010)
China(GB50011-2001)
China Shanghai(DGJ08-9-2003)

Analytical Period : IS1893(2016)
IS1893(2002)

Approximate Period : Taiwan(2022)

Fundamental Period : Taiwan(2011)

Response Modification Factor (R) : Taiwan(2006)
Taiwan(1999)

Seismic Load Direction Factor : P100-1(2013)
DRT_1304(1302-6.1-2018)

X-Direction : 1

Accidental Eccentricity
X-Direction (Ex) : Positive Negative None
Y-Direction (Ey) : Positive Negative None

Torsional Amplification
Accidental Eccentricity Inherent Eccentricity

Additional Seismic Loads (Unit:N,m)

Story	Add.-X	Add.-Y	Add.-RZ

Seismic Load Profile... OK Cancel Apply

Add 'User Type'

Load Case Name : EX

Seismic Load Code : User Type

Description :

	Story	Weight	Elev.	Seismic Force	
				X-Dir	Y-Dir
	Roof	1831.29	31.85	0	0
	8F	4646.47	25.8	0	0
	7F	2319.76	22.8	0	0
	6F	2267.92	19.8	0	0
	5F	2267.92	16.8	0	0
	4F	2299.56	13.8	0	0
	3F	2331.2	10.8	0	0
	2F	2331.2	7.8	0	0
	1F	2947.96	4.8	0	0
	B1	4366.04	1	0	0
*					

Seismic Load Direction Factor (Scale Factor)
X-Direction : 1 Y-Direction : 1

Accidental Eccentricity
X-Direction (Ex) : Positive Negative None
Y-Direction (Ey) : Positive Negative None

Torsional Amplification
Accidental Eccentricity Inherent Eccentricity

Additional Seismic Loads (Unit:kN,m)

Story	Add.-X	Add.-Y	Add.-RZ

Seismic Load Profile... OK Cancel Apply

[User Type]

- We can generate these datas automatically (Story Name/Elev./Loaded H/ Loaded B)

2. User Type Wind Load

Add/Modify Wind Load Specification

Load Case Name : WX

Wind Load Code : IBC2012(ASCE7-10) Import

Description :

Alternate Method

Wind Load Parameter

Basic Wind Speed : Eurocode-1(2005)

Exposure Category : BS6399(1997)

Mean Roof Height : KDS(41-10-15:2019)

Topographic Effects : Korea(Arch. 2000)

Directional Factor : Rigid Structure

Gust Effect Factor : Japan(Arch. 2000)

Load Evaluation Use

Force Coefficient : DPT-1331-50:2007

Wind Eccentricity

X-Dir. (Wx) : Positive Negative None

Y-Dir. (Wy) : Positive Negative None

Wind Load Direction Factor (Scale Factor)

X-Dir. 1 Y-Dir. 1 Z-Rot. 0

Additional Wind Loads (Unit:kN,m)

Story	Add.-X	Add.-Y	Add.-RZ

Wind Load Profile... OK Cancel Apply

Add 'User Type'

Add/Modify Wind Load Specification

Load Case Name : WX

Wind Load Code : User Type Import

Description :

Story	Elev.	Wind Pressure		Loaded H
		X-Dir	Y-Dir	
Roof	31.85	0	0	3.025
8F	25.8	0	0	4.525
7F	22.8	0	0	3
6F	19.8	0	0	3
5F	16.8	0	0	3
4F	13.8	0	0	3
3F	10.8	0	0	3
2F	7.8	0	0	3
1F	4.8	0	0	3.4
B1	1	0	0	2.7155

Wind Eccentricity

X-Dir. (Wx) : Positive Negative None

Y-Dir. (Wy) : Positive Negative None

Wind Load Direction Factor (Scale Factor)

X-Dir. 1 Y-Dir. 1 Z-Rot. 0

Additional Wind Loads (Unit:kN,m)

Story	Add.-X	Add.-Y	Add.-RZ

Wind Load Profile... OK Cancel Apply

[User Type]

- We can generate these data automatically (Story Name/Elev./Width for each story)

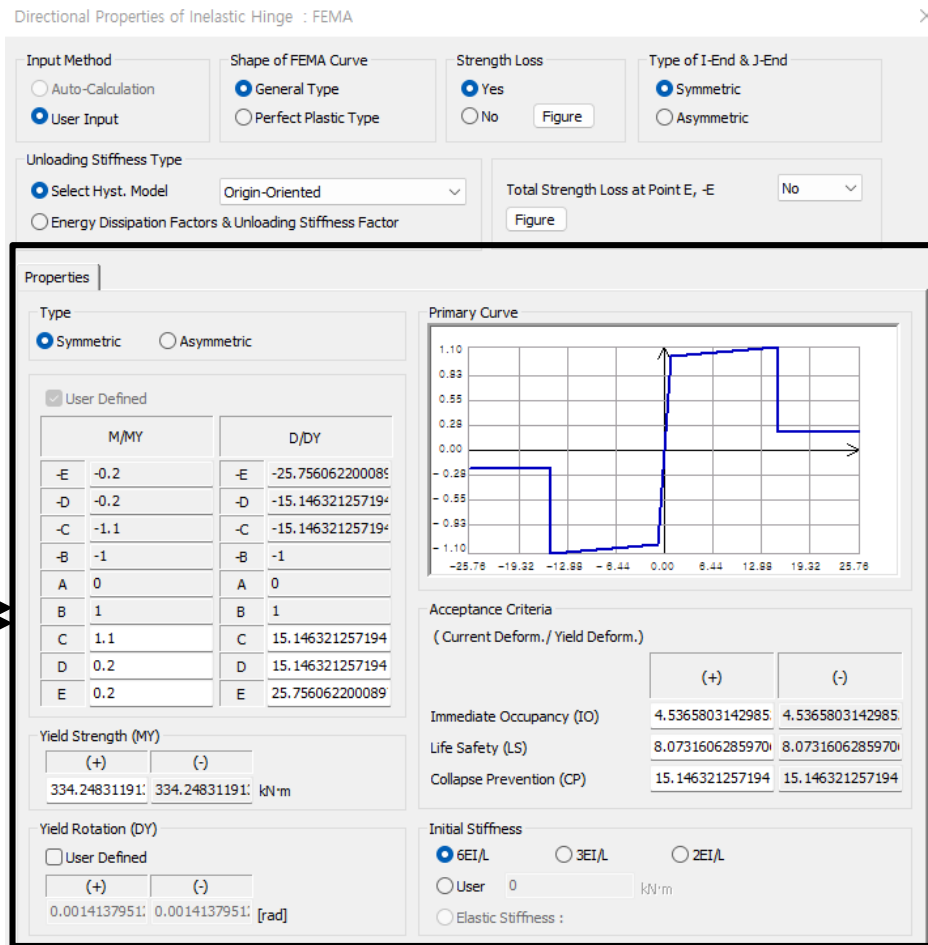
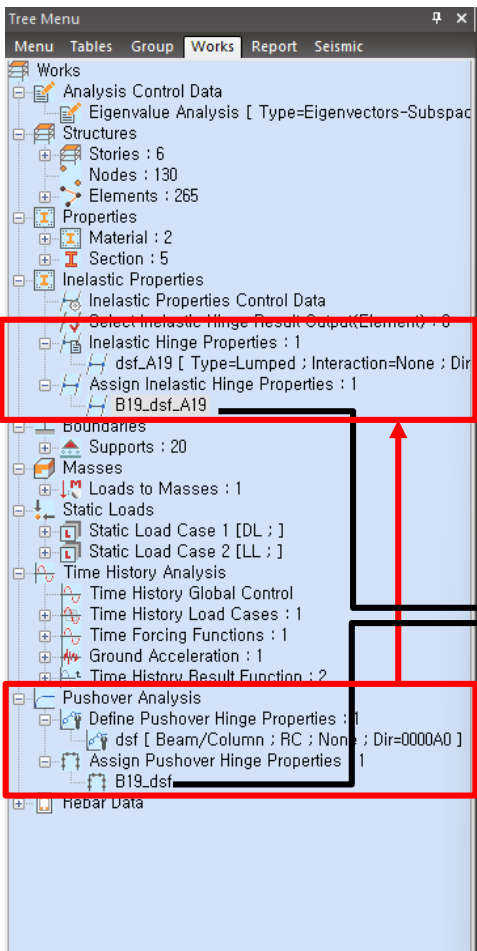
3. Import Pushover Hinge Properties

Properties > Inelastic Properties > Inelastic Hinge > Import Pushover Hinge Properties

Hinge properties set in Pushover analysis can be imported to Inelastic Hinge Properties for the time history analysis.

Since Inelastic hinge properties are set before analysis, auto-calculation is not supported.

If the inelastic hinge properties are the same as the pushover's hinge properties, time history analysis can be performed quickly by bringing the automatically generated hinge properties.



Appendix.

*Guide to input User Type
Seismic Load*

Seismic Static Load *Added 'User Type' in the Seismic Load code.*

Add/Modify Seismic Load Specification

Load Case Name : EX

Seismic Load Code : IBC2012(ASCE7-10) Import

Description : IBC2000(ASCE7-98)
 UBC(1997)
 UBC(1991)
 ATC3-06
 NBC(1995)
 NTC2018
 NTC2012
 NTC2008
 Eurocode-8(2004)
 Eurocode-8(1996)
 KDS(41-17-00:2019)
 KBC(2016)
 KBC(2009)
 KBC(2005)
 Korea(Arch. 2000)
 Korea(Arch. 1992)
 China(GB50011-2010)
 China(GB50011-2001)
 China Shanghai(DGJ08-9-2003)
 IS1893(2016)
 IS1893(2002)
 Taiwan(2022)
 Taiwan(2011)
 Taiwan(2006)
 Taiwan(1999)
 Japan(Arch. 2000)
 NSR-10
 P100-1(2013)
 DPT_1301/1302-61:2018

Seismic Load Parameters
 Design Spectral Respo
 Site Class : D
 Ss : 0.75 Fa :
 S1 : 0.3 Fv :
 Period Coef. (Cu)
 Risk Category
 Seis. Design Category :
 Structural Parameters
 Analytical Period :
 Approximate Period :
 Fundamental Period :
 Response Modification Factor (R)
 Seismic Load Direction Fa
 X-Direction : 1 **User Type**

Accidental Eccentricity
 X-Direction (Ex) : Positive Negative None
 Y-Direction (Ey) : Positive Negative None

Torsional Amplification
 Accidental Eccentricity Inherent Eccentricity

Additional Seismic Loads (Unit:N,m)

Story	Add.-X	Add.-Y	Add.-RZ

Seismic Load Profile... OK Cancel Apply



Add/Modify Seismic Load Specification

Load Case Name : EX

Seismic Load Code : User Type Import

Description :

	Story	Weight	Elev.	Seismic Force	
				X-Dir	Y-Dir
	Roof	1831.29	31.85	0	0
	8F	4646.47	25.8	0	0
	7F	2319.76	22.8	0	0
	6F	2267.92	19.8	0	0
	5F	2267.92	16.8	0	0
	4F	2299.56	13.8	0	0
	3F	2331.2	10.8	0	0
	2F	2331.2	7.8	0	0
	1F	2947.96	4.8	0	0
	B1	4366.04	1	0	0
*					

Seismic Load Direction Factor (Scale Factor)
 X-Direction : 1 Y-Direction : 1

Accidental Eccentricity
 X-Direction (Ex) : Positive Negative None
 Y-Direction (Ey) : Positive Negative None

Torsional Amplification
 Accidental Eccentricity Inherent Eccentricity

Additional Seismic Loads (Unit:kN,m)

Story	Add.-X	Add.-Y	Add.-RZ

Seismic Load Profile... OK Cancel Apply

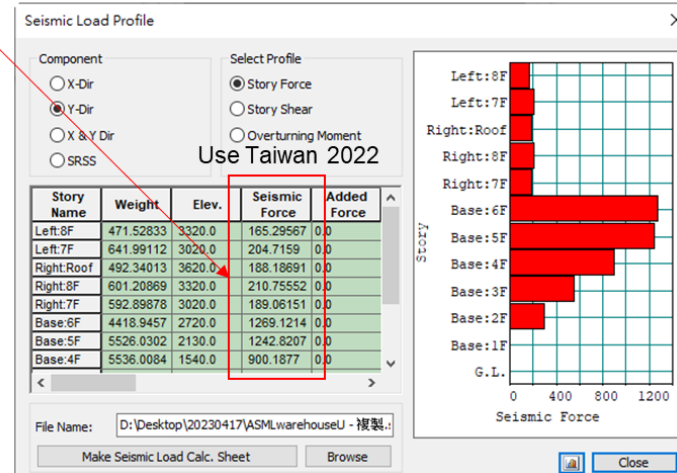
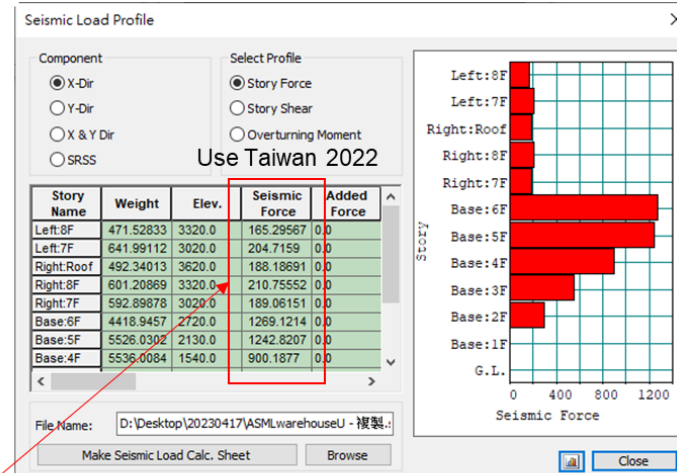
1. "Story Name/Weight/Elev." information is automatically filled (Read Only)
2. Seismic Force (x,y direction) is initial state (filled with 0.0). Real numbers can be entered (not read only)

Seismic Static Load Added 'User Type' in the Seismic Load code.

This additional function can be use to input the seismic load for multi – module story building, such as multi – tower building. Because when using the Taiwan seismic code, can't accurately calculate the story force for that kind of building.

Hand Calculation

Module	Story Name	Weight	Elev.	Seismic Force	
				X-Direction	Y-Direction
Left	8F	471.528	3320	208.472	208.472
Left	7F	641.991	3020	141.919	141.919
Right	Roof	492.34	3620	239.528	239.528
Right	8F	601.209	3320	194.996	194.996
Right	7F	592.899	3020	96.150	96.150
Base	6F	4418.95	2720	1390.540	1390.540
Base	5F	5526.03	2130	1361.692	1361.692
Base	4F	5536.01	1540	986.288	986.288
Base	3F	5507.61	950	605.303	605.303
Base	2F	4645.75	600	322.473	322.473
Base	1F	308.384	10	0.000	0.000



Seismic Static Load *Added 'User Type' in the Seismic Load code.*

After you calculate all seismic force at X-Direction and Y-Direction, at midas Gen you can immediately copy and paste the seismic force at X-Direction and Y-Direction.

Hand Calculation

Module	Story Name	Weight	Elev.	Seismic Force	
				X-Direction	Y-Direction
Left	8F	471.528	3320	208.472	208.472
Left	7F	641.991	3020	141.919	141.919
Right	Roof	492.34	3620	239.528	239.528
Right	8F	601.209	3320	194.996	194.996
Right	7F	592.899	3020	96.150	96.150
Base	6F	4418.95	2720	1390.540	1390.540
Base	5F	5526.03	2130	1361.692	1361.692
Base	4F	5536.01	1540	986.288	986.288
Base	3F	5507.61	950	605.303	605.303
Base	2F	4645.75	600	322.473	322.473
Base	1F	308.384	10	0.000	0.000

User Type Seismic Load

Add/Modify Seismic Load Specification

Load Case Name : EX

Seismic Load Code : User Type

Description :

Story	Weight	Elev.	Seismic Force	
			X-Dir	Y-Dir
8F	471.528	3320	0	0
7F	641.991	3020	0	0
Roof	492.34	3620	0	0
8F	601.209	3320	0	0
7F	592.899	3020	0	0
6F	4418.95	2720	0	0
5F	5526.03	2130	0	0
4F	5536.01	1540	0	0
3F	5507.61	950	0	0
2F	4645.75	600	0	0
1F	308.384	10	0	0

Seismic Load Direction Factor (Scale Factor)
 X-Direction : 1 Y-Direction : 1

Accidental Eccentricity
 X-Direction (Ex) : Positive Negative None
 Y-Direction (Ey) : Positive Negative None

Torsional Amplification
 Accidental Eccentricity Inherent Eccentricity

Additional Seismic Loads (Unit:tonf,cm)

Story	Add.-X	Add.-Y	Add.-RZ

Seismic Load Profile... OK Cancel Apply

Add/Modify Seismic Load Specification

Load Case Name : EX

Seismic Load Code : User Type

Description :

Story	Weight	Elev.	Seismic Force	
			X-Dir	Y-Dir
8F	471.528	3320	208.472	208.472
7F	641.991	3020	141.918	141.918
Roof	492.34	3620	239.527	239.527
8F	601.209	3320	194.995	194.995
7F	592.899	3020	96.1502	96.1502
6F	4418.95	2720	1390.54	1390.54
5F	5526.03	2130	1361.69	1361.69
4F	5536.01	1540	986.287	986.287
3F	5507.61	950	605.302	605.302
2F	4645.75	600	322.472	322.472
1F	308.384	10	0	0

Seismic Load Direction Factor (Scale Factor)
 X-Direction : 1 Y-Direction : 0

Accidental Eccentricity
 X-Direction (Ex) : Positive Negative None
 Y-Direction (Ey) : Positive Negative None

Torsional Amplification
 Accidental Eccentricity Inherent Eccentricity

Additional Seismic Loads (Unit:tonf,cm)

Story	Add.-X	Add.-Y	Add.-RZ

Seismic Load Profile... OK Cancel Apply

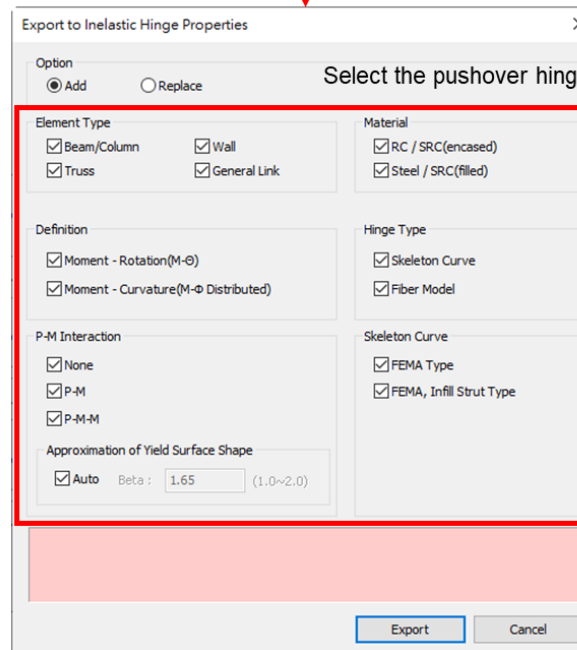
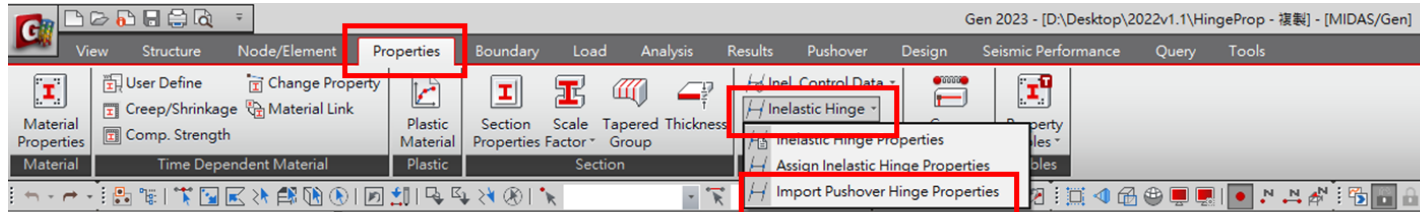
Appendix.

*Guide to Export
Pushover Hinge for
Inelastic Hinge Properties*

Export Pushover Hinge to Inelastic Hinge Property

This additional function help the user to immediately use the pushover hinge in the inelastic hinge property.

Properties > Inelastic Hinge > Import Pushover Hinge Properties



Export Pushover Hinge to Inelastic Hinge Property

Menu Tables Group Works Report Seis...

Works

- Analysis Control Data
- Eigenvalue Analysis [Type=Eigenvectors-Su
- Structures
 - Stories : 7
 - Nodes : 132
 - Elements : 266
- Properties
 - Material : 27
 - Section : 93
 - Thickness : 3
- Boundaries
 - Supports : 12
 - Panel Zone Effects [Offset Factor=0.75 ; Out
- Masses
 - Loads to Masses : 1
- Static Loads
 - Static Load Case 1 [DL ;]
 - Static Load Case 2 [LL ;]
 - Static Load Case 3 [EX ;]
 - Static Load Case 4 [EY ;]
 - Static Load Case 5 [COM ;]
- Pushover Analysis
 - Pushover Global Control [Max. Iteration=...
 - Pushover Load Case : 1
 - Define Pushover Hinge Properties : 240
 - Assign Pushover Hinge Properties : 221
 - Pushover Smart Result
- Rebar Data
 - Beam
 - Column

Export these pushover hinge.

Export to Inelastic Hinge Properties

Option

Add Replace

Element Type

Beam/Column Wall

Truss General Link

Material

RC / SRC(encased)

Steel / SRC(filled)

Definition

Moment - Rotation(M-θ)

Moment - Curvature(M-φ Distributed)

Hinge Type

Skeleton Curve

Fiber Model

P-M Interaction

None

P-M

P-M-M

Skeleton Curve

FEMA Type

FEMA, Infill Strut Type

Approximation of Yield Surface Shape

Auto Beta : 1.65 (1.0~2.0)

Export Cancel

Menu Tables Group Works Report Seis...

Works

- Analysis Control Data
- Eigenvalue Analysis [Type=Eigenvectors-Su
- Structures
 - Stories : 7
 - Nodes : 132
 - Elements : 266
- Properties
 - Material : 27
 - Section : 93
 - Thickness : 3
- Inelastic Properties
 - Inelastic Properties Control Data
 - Select Inelastic Hinge Result Output(Element)
 - Inelastic Hinge Properties : 221
 - Assign Inelastic Hinge Properties : 221
- Boundaries
 - Supports : 12
 - Panel Zone Effects [Offset Factor=0.75 ; Out
- Masses
 - Loads to Masses : 1
- Static Loads
 - Static Load Case 1 [DL ;]
 - Static Load Case 2 [LL ;]
 - Static Load Case 3 [EX ;]
 - Static Load Case 4 [EY ;]
 - Static Load Case 5 [COM ;]
- Pushover Analysis
 - Pushover Global Control [Max. Iteration=...
 - Pushover Load Case : 1
 - Define Pushover Hinge Properties : 240
 - Assign Pushover Hinge Properties : 221
 - Pushover Smart Result
- Rebar Data
 - Beam
 - Column

Export Pushover Hinge to Inelastic Hinge Property

Add/Modify Pushover Hinge Properties

Name: PH-Beam001 Description:

Element Type: Beam/Column Wall Truss General Link Point Spring Support

Material Type: RC / SRC (encased) Steel / SRC (filled) Masonry

Wall Type: Membrane Plate

Definition: Moment - Rotation (M-Theta) Moment - Curvature (M-FH Lumped) Moment - Curvature (M-FH Distributed)

Hinge Type: Skeleton Model Fiber Model

Axial-Moment Interaction Type: None P-M Interaction P-M-M in Status Determination

Axial-Shear Interaction Type of RC: None P-Q Interaction

Fiber Section: Auto Generation User Defined

Component Properties:

Component	Hinge Location	Skeleton Curve	Properties...
<input type="checkbox"/> Fx	[J]-end	Trilinear Type	Properties...
<input type="checkbox"/> Fy	[J]-end	Trilinear Type	Properties...
<input type="checkbox"/> Fz	[J]-end	Trilinear Type	Properties...
<input type="checkbox"/> Mx	[J]-end	Trilinear Type	Properties...
<input checked="" type="checkbox"/> My	[J]-end	FEMA	Properties...
<input type="checkbox"/> Mz	[J]-end	Trilinear Type	Properties...

Add/modify inelastic hinge properties

Name: PH-Beam001-1 Description:

Element Type: Beam-Column Wall Truss General Link

Material Type: RC/SRC (encased) Steel/SRC (filled)

Wall Type: Membrane Plate

Definition: Moment - Rotation (M-Theta) Moment - Curvature (M-FH Distributed)

Hinge type: Skeleton Model Fiber Model

Interaction type: None P-M in Strength Calculation P-M-M in status determination

Fiber Section: Auto Generation User Defined

Component Properties:

Component	Hinge Location	Hysteresis Model	Properties...
<input type="checkbox"/> Fx	Center	Kinematic Hardening	Properties...
<input type="checkbox"/> Fy	[J]	Kinematic Hardening	Properties...
<input type="checkbox"/> Fz	[J]	Kinematic Hardening	Properties...
<input type="checkbox"/> Mx	[J]	Kinematic Hardening	Properties...
<input checked="" type="checkbox"/> My	[J]	FEMA	Properties...
<input type="checkbox"/> Mz	[J]	Kinematic Hardening	Properties...

Directional Properties of Pushover Hinge : FEMA

Input Method: Auto-Calculation User Input

Shape of FEMA Curve: General Type Perfect Plastic Type

Strength Loss: Yes No

Type of I-End & J-End: Symmetric Asymmetric

Unloading Stiffness Type: Select Hyst. Model Energy Dissipation Factors & Unloading Stiffness Factor

Properties of I-end | Properties of J-end

Type: Symmetric Asymmetric

M/M _y		D/D _y	
E	-27.1507	E	-1157.554046
D	-27.5924	D	-341.938427
C	-27.7053	C	-83.518655
B	-1	B	-1
A	0	A	0
B	1	B	1
C	27.7053	C	83.518655
D	27.5924	D	341.938427
E	27.1507	E	1157.554046

Primary Curve:

Acceptance Criteria (Current Deform./Yield Deform.):

	(+)	(-)
Immediate Occupancy (IO)	83.518655	83.518655
Life Safety (LS)	341.938427	341.938427
Collapse Prevention (CP)	1157.554046	1157.554046

Yield Strength (M_y): (+) (-) (kgf/cm)

Yield Rotation (D_y): User Defined Elastic Stiffness

Unloading Stiffness Parameter: Exponent in Unloading Stiffness Calculation: 0.4, Pinching-Rule Factor (0.7/1.0): 0.5

Directional Properties of Inelastic Hinge : FEMA

Input Method: Auto-Calculation User Input

Shape of FEMA Curve: General Type Perfect Plastic Type

Strength Loss: Yes No

Type of I-End & J-End: Symmetric Asymmetric

Unloading Stiffness Type: Select Hyst. Model Energy Dissipation Factors & Unloading Stiffness Factor

Properties of I-end | Properties of J-end

Type: Symmetric Asymmetric

M/M _y		D/D _y	
E	-27.1507	E	-1157.554046
D	-27.5924	D	-341.938427
C	-27.7053	C	-83.518655
B	-1	B	-1
A	0	A	0
B	1	B	1
C	27.7053	C	83.518655
D	27.5924	D	341.938427
E	27.1507	E	1157.554046

Primary Curve:

Acceptance Criteria (Current Deform./Yield Deform.):

	(+)	(-)
Immediate Occupancy (IO)	83.518655	83.518655
Life Safety (LS)	341.938427	341.938427
Collapse Prevention (CP)	1157.554046	1157.554046

Yield Strength (M_y): (+) (-) (kgf/cm)

Yield Rotation (D_y): User Defined Elastic Stiffness

Unloading Stiffness Parameter: Exponent in Unloading Stiffness Calculation: 0.4, Pinching-Rule Factor (0.7/1.0): 0.5

Export Pushover Hinge to Inelastic Hinge Property

Add/Modify Pushover Hinge Properties

Properties
 Unable to Modify Enable to Modify

Name : 857_PH-Column013 Description :

Element Type
 Beam/Column Wall Truss General Link Point Spring Support

Material Type
 RC / SRC (encased) Steel / SRC (Reed) Masonry

Wall Type
 Membrane Plate

Definition
 Moment - Rotation (M-Theta) Moment - Curvature (M-Phi Lumped) Consider Hinge Length Moment - Curvature (M-Phi Distributed)

Hinge Type
 Skeleton Model Fiber Model

Axial-Moment Interaction Type
 None P-M Interaction P-M-M in Status Determination

Axial-Shear Interaction Type of RC
 None P-Q Interaction

Component Properties

Component	Hinge Location	Skeleton Curve
<input type="checkbox"/> Fx	[3]-end	Trilinear Type
<input type="checkbox"/> Fy	[3]-end	Trilinear Type
<input type="checkbox"/> Fz	[3]-end	Trilinear Type
<input type="checkbox"/> Mx	[3]-end	Trilinear Type
<input checked="" type="checkbox"/> My	[3]-end	FEMA
<input type="checkbox"/> Mz	[3]-end	Trilinear Type

Add/modify inelastic hinge properties

Name : PH-Column013-1 Description :

Element Type
 Beam-Column Wall Truss General Link

Material Type
 RC/SRC (encased) Steel/SRC (Reed)

Wall Type
 Membrane Plate

Definition
 Moment - Rotation (M-Theta) Moment - Curvature (M-Phi Distributed)

Hinge type
 Skeleton Model Fiber Model

Interaction type
 None P-M in Strength Calculation P-M-M in status determination

Fiber Section
 Auto Generation User Defined

Component Properties

Component	Hinge Location	Hysteresis Model
<input type="checkbox"/> Fx	Center	Kinematic Hardening
<input type="checkbox"/> Fy	[3]	Kinematic Hardening
<input type="checkbox"/> Fz	[3]	Kinematic Hardening
<input type="checkbox"/> Mx	[3]	Kinematic Hardening
<input checked="" type="checkbox"/> My	[3]	FEMA
<input type="checkbox"/> Mz	[3]	Kinematic Hardening

Directional Properties of Pushover Hinge : FEMA

Input Method
 Auto-Calculation User Input

Shape of FEMA Curve
 General Type Perfect Plastic Type

Strength Loss
 Yes No

Type of I-End & J-End
 Symmetric Asymmetric

Unloading Stiffness Type
 Select Hyst. Model Energy Dissipation Factors & Unloading Stiffness Factor

Properties of I-end | Properties of J-end

Type
 Symmetric Asymmetric

Primary Curve

M/M _y	D/D _y
E -3.0335	E -16.818118
D -3.4129	D -16.208346
C -3.5645	C -8.325074
B -1	B -1
A 0	A 0
D 3.4129	D 16.208346
E 3.0335	E 16.818118

Acceptance Criteria (Current Deform./ Yield Deform.)

	(+)	(-)
Immediate Occupancy (IO)	8.325074	8.325074
Life Safety (LS)	16.208346	16.208346
Collapse Prevention (CP)	16.818118	16.818118

Yield Strength (R_y)
 (+) 686025.7 (-) 686025.7 kgf/cm

Yield Rotation (R_y)
 User Defined 0 (-) 0 [rad]

Initial Stiffness
 6E1A 3E1A 2E1A User 0 (-) 0 kgf/cm

Unloading Stiffness Parameter
 Exponent in Unloading Stiffness Calculation 0.4
 Pinching-Rule Factor (07/11.0) 0.5

Directional Properties of Inelastic Hinge : FEMA

Input Method
 Auto-Calculation User Input

Shape of FEMA Curve
 General Type Perfect Plastic Type

Strength Loss
 Yes No

Type of I-End & J-End
 Symmetric Asymmetric

Unloading Stiffness Type
 Select Hyst. Model Energy Dissipation Factors & Unloading Stiffness Factor

Properties of I-end | Properties of J-end

Type
 Symmetric Asymmetric

Primary Curve

M/M _y	D/D _y
E -3.0335	E -16.818118
D -3.4129	D -16.208346
C -3.5645	C -8.325074
B -1	B -1
A 0	A 0
D 3.4129	D 16.208346
E 3.0335	E 16.818118

Acceptance Criteria (Current Deform./ Yield Deform.)

	(+)	(-)
Immediate Occupancy (IO)	8.325074	8.325074
Life Safety (LS)	16.208346	16.208346
Collapse Prevention (CP)	16.818118	16.818118

Yield Strength (R_y)
 (+) 686025.7 (-) 686025.7 kgf/cm

Yield Rotation (R_y)
 User Defined 3E1A 2E1A Elastic Stiffness :

Unloading Stiffness Parameter
 Exponent in Unloading Stiffness Calculation 0.4
 Pinching-Rule Factor (07/11.0) 0.5

Export Pushover Hinge to Inelastic Hinge Property

Add/Modify Pushover Hinge Properties

Properties
 Unable to Modify Enable to Modify

Name: T1001_PH-Wal001 Description:

Element Type
 Beam/Column Wall
 Truss General Link
 Point Spring Support

Material Type
 RC / SRC (encased)
 Steel / SRC (Reed)
 Masonry

Wall Type
 Membrane
 Plate

Definition
 Moment - Rotation (M-Theta)
 Moment - Curvature (M-Phi Lumped)
 Consider Hinge Length Integration Point
 Moment - Curvature (M-Phi Distributed)

Hinge Type
 Skeleton Model
 Fiber Model

Axial-Moment Interaction Type
 None P-M Interaction
 P-M-M in Status Determination

Axial-Shear Interaction Type of RC
 None P-Q Interaction

Component Properties

Component
 Fx Fy Fz
 Mx My Mz

Skeleton Curve
 FEMA
 Trilinear Type
 Trilinear Type
 Trilinear Type
 Trilinear Type
 Trilinear Type

Yield Surface Properties...

Add/modify inelastic hinge properties

Name: PH-Wal001-1

Description:

Element Type
 Beam-Column Wall
 Truss General Link

Material Type
 RC/SRC (encased)
 Steel/SRC (Reed)

Wall Type
 Membrane
 Plate

Definition
 Moment - Rotation (M-Theta)
 Moment - Curvature (M-Phi Distributed)

Hinge type
 Skeleton Model
 Fiber Model

Interaction type
 None
 P-M in Strength Calculation
 P-M-M in status determination

Fiber Section
 Auto Generation User Defined
 Section:
 Fiber Name:

Component Properties

Component
 Fx Fy Fz
 Mx My Mz

Hysteresis Model
 FEMA
 Kinematic Hardening
 Kinematic Hardening
 Kinematic Hardening
 Kinematic Hardening
 Kinematic Hardening

Directional Properties of Pushover Hinge : FEMA

Input Method
 Auto-Calculation User Input

Shape of FEMA Curve
 General Type Perfect Plastic Type

Strength Loss
 Yes No

Type of I-End & J-End
 Symmetric Asymmetric

Unloading Stiffness Type
 Select Hyst. Model Energy Dissipation Factors & Unloading Stiffness Factor
 Origin-Oriented
 Total Strength Loss at Point E, -E Yes No

Properties of I&J-end

Type
 Symmetric Asymmetric

User Defined

F/Fy	D/Dy
E -4.27	E -21.4779
D -4.27	D -19.4752
C -3.19	C -7.4126
B -1	B -1
A 0	A 0
B 1	B 1
C 3.19	C 7.4126
D 4.27	D 19.4752
E 4.27	E 21.4779

Primary Curve

Acceptance Criteria
 (Current Deform./ Yield Deform.)

	(+)	(-)
Immediate Occupancy (OO)	7.4126	7.4126
Life Safety (LS)	19.4752	19.4752
Collapse Prevention (CP)	21.4779	21.4779

Yield Strength (Fy)
 (+) (-)
 7822.7122310 7822.7122310 kgf

Yield Displacement (Dy)
 User Defined
 (+) (-)
 0 0 cm

Initial Stiffness
 6E/A 3E/A 2E/A
 User 0 kgf/cm
 Elastic Stiffness : EA/L

Unloading Stiffness Parameter
 Exponent in Unloading Stiffness Calculation 0.4
 Pinching-Rule Factor (07/1.0) 0.5

Directional Properties of Inelastic Hinge : FEMA

Input Method
 Auto-Calculation User Input

Shape of FEMA Curve
 General Type Perfect Plastic Type

Strength Loss
 Yes No

Type of I-End & J-End
 Symmetric Asymmetric

Unloading Stiffness Type
 Select Hyst. Model Energy Dissipation Factors & Unloading Stiffness Factor
 Origin-Oriented
 Total Strength Loss at Point E, -E Yes No

Properties of I&J-end

Type
 Symmetric Asymmetric

User Defined

F/Fy	D/Dy
E -4.27	E -21.4779
D -4.27	D -19.4752
C -3.19	C -7.4126
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A 0	A 0
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E 4.27	E 21.4779

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 (+) (-)
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 User 0 kgf/cm
 Elastic Stiffness : EA/L

Unloading Stiffness Parameter
 Exponent in Unloading Stiffness Calculation 0.4
 Pinching-Rule Factor (07/1.0) 0.5