

MIDAS/Gen V.720 Enhancements



Major Enhancements

Modeling & Analysis Part

- **Wind Load Calculation Standard Eurocode 1 (2005) has been added**
- **Static Seismic Load Calculation Standard Eurocode 8 (2004) has been added**
- **Masonry Material Models have been added**
- **Addition of a function to enable the input of Eccentric Beam Loads**
- **Enhancements of Pushover Analysis function**

Results Part

- **Display of Moment Combination in Plate Force/Moment Result**
- **Enhancements of Pushover Analysis Result**
- **Enhancements of Story Result Tables**
- **Display Story Shear Force for each Mode**



Major Enhancements

Design Part

- **Serviceability Checks as per Eurocode 2 & 3**
- **Assign Rebars by Members**
- **Disregard of Extremely Small Compression/Tension in Nonlinear Members**
- **Enhancements of Concrete Design Result (Rebar, Area and Ratio separately displayed)**
- **Enhancements of Steel Design**
- **Enhancements of Orthogonal Effect in Seismic Load Cases**

Miscellaneous

- **Enhancements of Display function**
- **Graphic Option added in Preferences Menu**
- **Save all Graphic Design Results as a graphic file format**



Contents

- (1) Wind Load Calculation Standard Eurocode 1 (2005) has been added**
- (2) Static Seismic Load Calculation Standard Eurocode 8 (2004) has been added**
- (3) Masonry Material Models have been added**
- (4) Addition of a function to enable the input of Eccentric Beam Loads**
- (5) Enhancements of Pushover Analysis function**



Modeling & Analysis Part

(1) Wind Load Calculation Standard Eurocode 1 (2005) has been added

Loads > Lateral Loads > Wind Load

Add/modify Wind Load Specification

Load Case Name : WX
 Wind Load Code : Eurocode-1(2005)
 Description :

Wind Load Parameters

Terrain Category : IV
 Friction Coefficient (Cfr) : 0,01
 Fund. Basic Wind Velocity (Vb,0) : 26 [m/s]
 Directional Factor (Cdir) : 1,5
 Seasonal Factor (Cseason) : 2

“Parameters for Mean Wind Velocity” dialog box

Automatic (selected) / User Defined

Windward(A=10) / Windward(A=1) / Leeward Coef.

Lack of Correlation Factor: Automatic / User Defined (1,5)

Parameters for Mean Wind Velocity (Vm)...

Structural Factor (CsCd) : 0,932508

Load Evaluation Using Force Coefficient:

Force Coefficient (Cf) : 1

Wind Load Direction Factor (Scale Factor)

X-Dir, 1 / Y-Dir, 0 / Z-Rot, 0

Additional Wind Loads

Story | Add, -X | Add, -Y | Add, -RZ

OK | Cancel | Apply

Parameters for Mean Wind Velocity

Consider Geographic Effects

Geography Type: City at Escarpment
 Building Location: Downwind

Height of Topographic Feature (H): 10 m
 Length of Upwind Slope (LU): 10 m
 Length of Downwind Slope (LD): 10 m
 Crest-Building Distance (D): 10 m

Consider Effects of Neighbouring High-rise Structures

Building Height (H): 20 m
 Average Height of Nearby Structures (Hn): 10 m
 Distance to the High-rise Structure (D): 10 m

Feature of the Neighbouring High-rise Structure

Larger Horizontal Dimension (L): 10 m
 Height (h): 10 m

Consider Raising of Displacement Height

Terrain Category: IV
 Obstruction Height (Hn): 10 m
 Upwind Spacing (s): 10 m

OK | Cancel

Structural Factor

Input Parameters for Structural Factor

Terrain Category: IV
 Basic Wind Velocity (Vb): 26 [m/s]
 Turbulence Factor (Kt): 2,5
 Building Height (h): 30 m
 Effects of Geography: Consider
 Effects of Neighbouring Structures: Consider

Calculate

Calculate Results

Reference Height (Zs): 25,2 m
 Mean Wind Velocity at Zs (Vm): 82,42005833 [m/s]
 Turbulence Length Scale of Zs (Lz): 74,99963026
 Turbulence Intensity at Zs (Iz): 0,157595238
 Turbulence Intensity at Zs (Iz): 0,103647906
 Density (rho): 1,188939992
 Reference Wind Pressure (qref): 1,392031497
 Reference Wind Pressure (qref): 0,4012281517
 Reference Wind Pressure (qref): 2,782967828
 Reference Wind Pressure (qref): 1,1021855901
 Reference Wind Pressure (qref): 0,527186244
 Reference Wind Pressure (qref): 0,3623662406
 Reference Wind Pressure (qref): 0,987780076
 Up-crossing Frequency (nu): 0,198770076
 Peak Factor (G): 3,780005301
 Structural Factor (CsCd): 0,932508

OK | Cancel

Reference

- MIDAS/Gen Online Manual V.720
 - Refer to Loads > Lateral Loads > Wind Load

Wind Load Profile

Component: X-Dir / Y-Dir / X & Y Dir / SRSS

Select Profile: Story Force / Story Shear / Overturning Moment

Story Name	Elev.	Pressure	Loaded H	Loaded B
Roof	50,0	5,0037679	2,0	27,6
12F	46,0	5,0037679	4,0	27,6
11F	42,0	5,0037679	4,0	27,6
10F	38,0	5,0037679	4,0	27,6
9F	34,0	5,0037679	4,0	27,6
8F	30,0	4,8277685	4,0	27,6
7F	26,0	4,8277685	4,0	27,6
6F	22,0	4,8277685	4,0	27,6
5F	18,0	4,8277685	4,0	27,6

File Name: F:\WGen-Online\WGen V.720\작업용모델\WZ

Make Wind Load Calc. Sheet | Browse

Close

Auto-calculation of Gust effect factor

Gust effect factor and auto-calculated parameters

Wind loads auto-calculated as per Eurocode (2005)

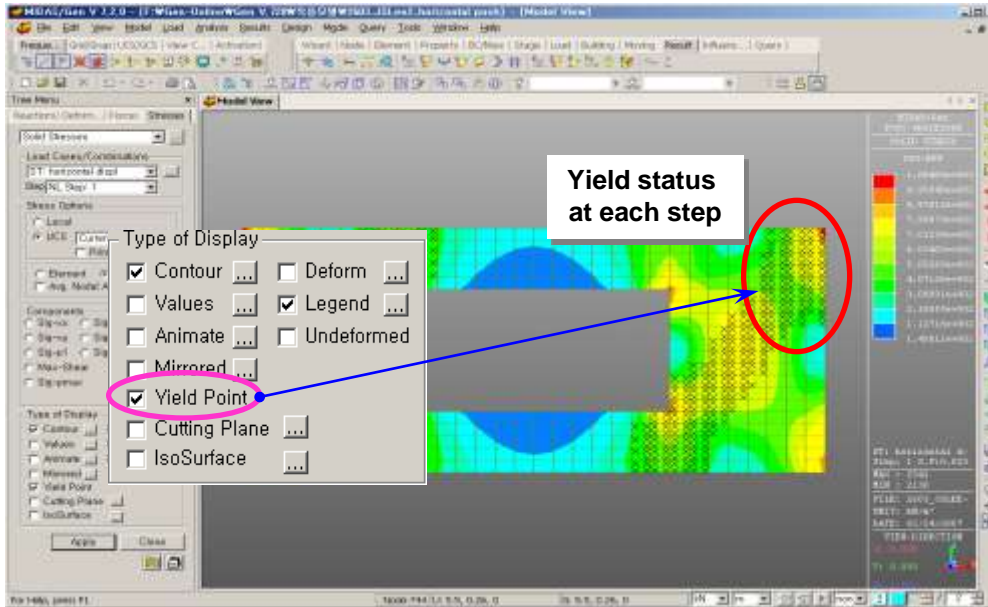
Wind Load Profile...

Modeling & Analysis Part

(3) Masonry Material Models have been added



Model > Property > Plastic Material

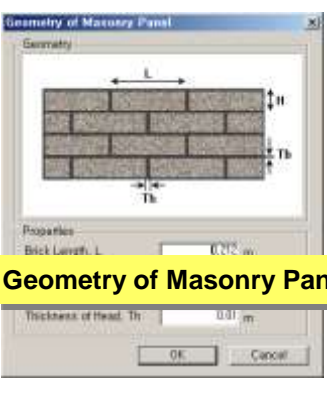
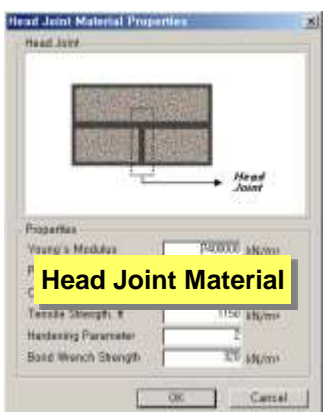
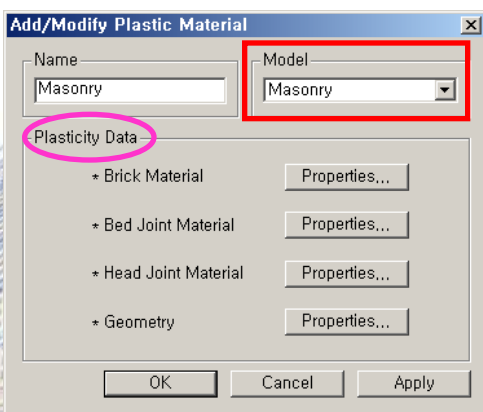


Related post-processor

- Results > Stresses > **Solid Stress**

Comment & Reference

- Applicable only to 8-node Solid elements
- MIDAS/Gen Online Manual V.720
- Refer to Model > Property > Plastic Material



Modeling & Analysis Part

(4) Addition of a function to enable the input of Eccentric Beam Loads

Load > *Element Beam Loads*

Load > *Line Beam Loads*

Input of Eccentric Beam Loads

Example of input of eccentric beam load

Applied eccentric loads

Centroid

Centroid

$M = P \times e$

Comments & Reference

- Eccentric beam loads can be inputted in ECS or GCS.
- Eccentric beam load is applied as a concentrated load and a moment due to eccentricity internally by the program.
- MIDAS/Gen Online Manual V.720
 - Refer to Loads > Element Beam Load & Line Beam Load

(5) Enhancements of Pushover Analysis function

A. Pushover Analysis function can be applied to Spring type General Link Elements – Elastic property

Model > Boundary > General Link Property

Add/Modify General Link Properties

Name : GLLINK

Application Type : Element Force

Property Type : **Spring** Applicable to Spring Type only

Description :

Self Weight

Total Weight : 0 kN Use Mass Total Mass : 0 kN/g

Linear Properties

DOF	Stiffness		
<input checked="" type="checkbox"/> Dx	10000 kN/m	0	kN-sec/m
<input checked="" type="checkbox"/> Dy	10000 kN/m	0	kN-sec/m
<input checked="" type="checkbox"/> Dz	10000 kN/m	0	kN-sec/m
<input checked="" type="checkbox"/> Rx	10000 kN-m/[rad]	0	kN-m-sec/[rad]
<input checked="" type="checkbox"/> Ry	10000 kN-m/[rad]	0	kN-m-sec/[rad]
<input checked="" type="checkbox"/> Rz	10000 kN-m/[rad]	0	kN-m-sec/[rad]

Shear Spring Location

Shear Spring Location

Distance Ratio From End I Dy : 0.5 Dz : 0.5

OK Cancel Apply

Comment & Reference

- User can define the Shear Spring Location (the option to consider the additional moment occurring at the end of the element due to shear deformation).
- MIDAS/Gen Online Manual V.720
- Refer to Model > Boundary > General Link Property



B. Pushover Analysis function can be applied to Inelastic Hinges – Inelastic property

Model > Boundary > General Link Property

Model > Property > Inelastic Hinge Property

Comment & Reference

- MIDAS/Gen Online Manual V.720
 - Refer to Model > Property > Inelastic Hinge Property
 - Refer to Model > Boundary > General Link Property

Spring Type

Applicable to inelastic hinges

Applicable only when User Input, Spring and None types are selected

All Hysteresis Models built-in MIDAS/Gen can be used

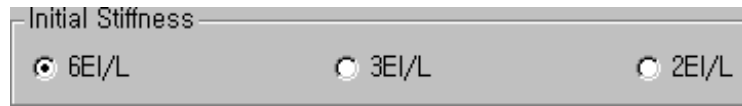
Hysteresis Model



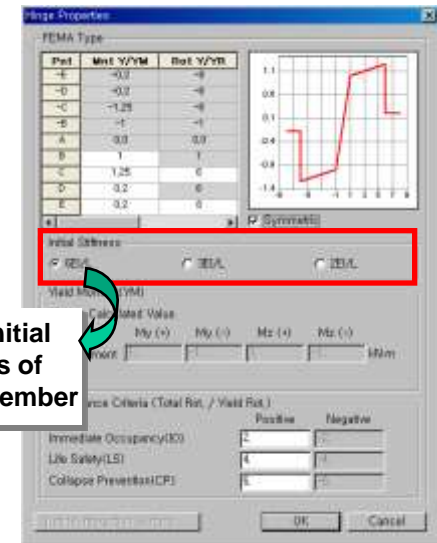
C. Enhancements of Plastic Hinges

i. Disequilibrium force in a member has been resolved

a. **FEMA Type:** Enable the user to define the initial stiffness of flexural member to be used in inelastic analysis



Define initial stiffness of flexural member



b. **Multi-linear Type:** Distributed hinge type for inelastic time history analysis has been added

ii. Improvement in convergence of pushover analysis using wall elements

	Pushover Analysis	
	Multi-linear	FEMA
Flexural member	$M - \phi$	$M - \theta$
Inelastic hinge	At both ends of a member	At both ends of a member
Plastic length of a member	1/6L from both ends	0
Flexibility of a member	$F = F_{EI} + F_{Hinge}$	$F = F_{EI} + F_{Hinge}$

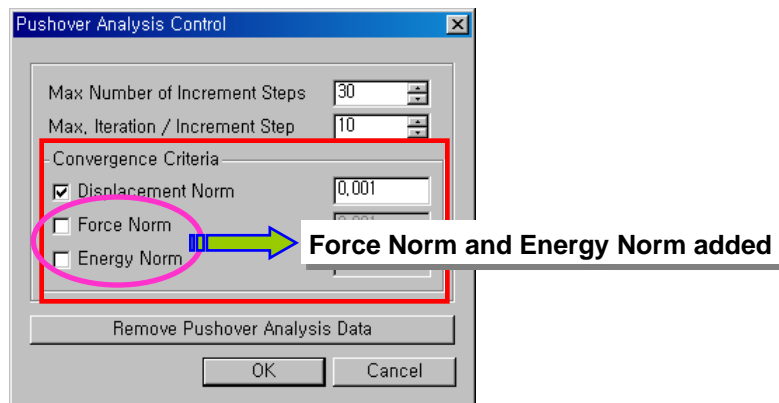




D. Enhancements in Convergence Problem and Reliability of Pushover Analysis

i. Convergence Criteria, Force Norm and Energy Norm have been added

Design > Pushover Analysis > Pushover Analysis Control



Reference

- MIDAS/Gen Online Manual V.720
- Refer to Design > Pushover Analysis > Pushover Analysis Control

ii. Residual disequilibrium force after the convergence for each increment is determined has been resolved

iii. Revision of hysteresis routine – Unloading routine added

iii. Enhancements of algorithm to improve other convergence problem





Contents

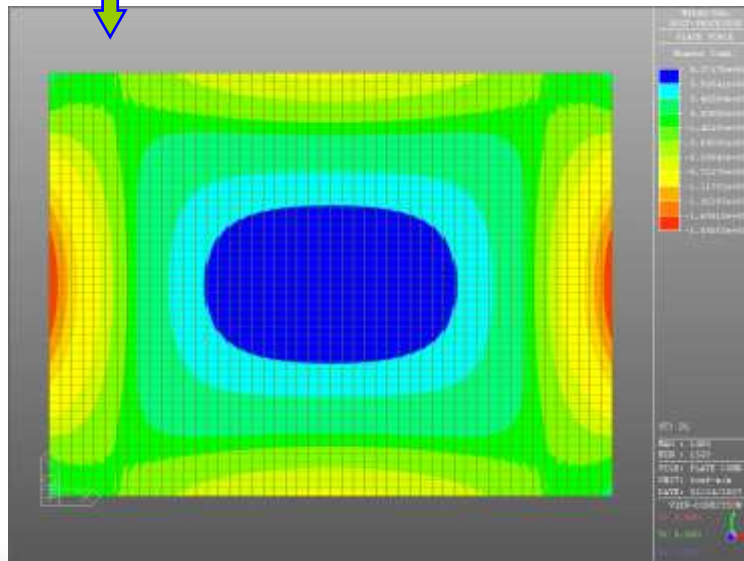
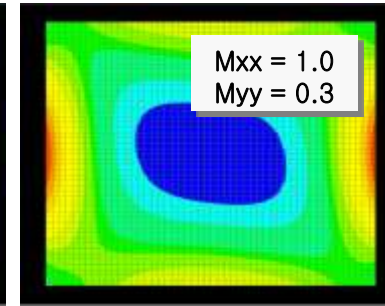
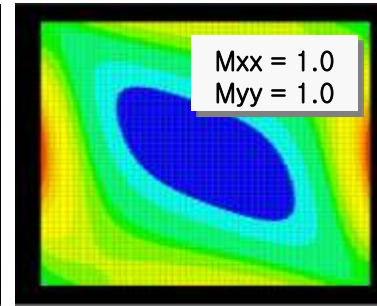
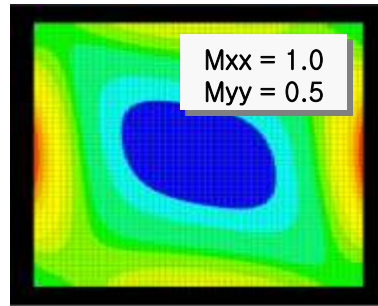
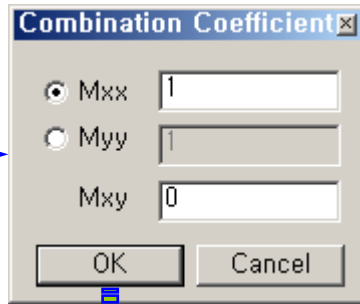
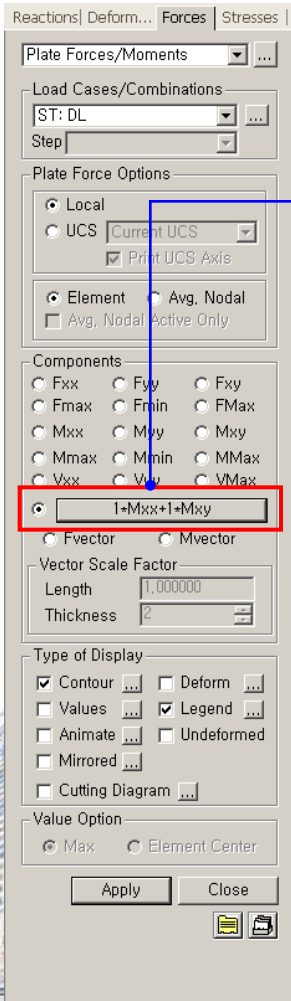
- (1) Display of Moment Combination in Plate Force/Moment Result**
- (2) Enhancements of Pushover Analysis Result**
- (3) Enhancements of Story Result Tables**
- (4) Display Story Shear Force for each Mode**



Results Part

(1) Display of Moment Combination in Plate Force/Moment Result

Results > Forces > Plate Forces / Moments



Reference

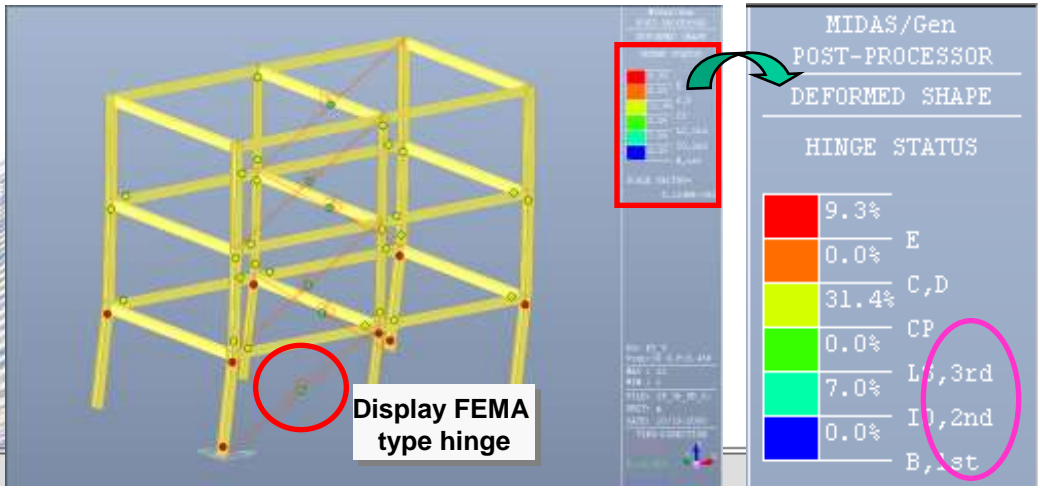
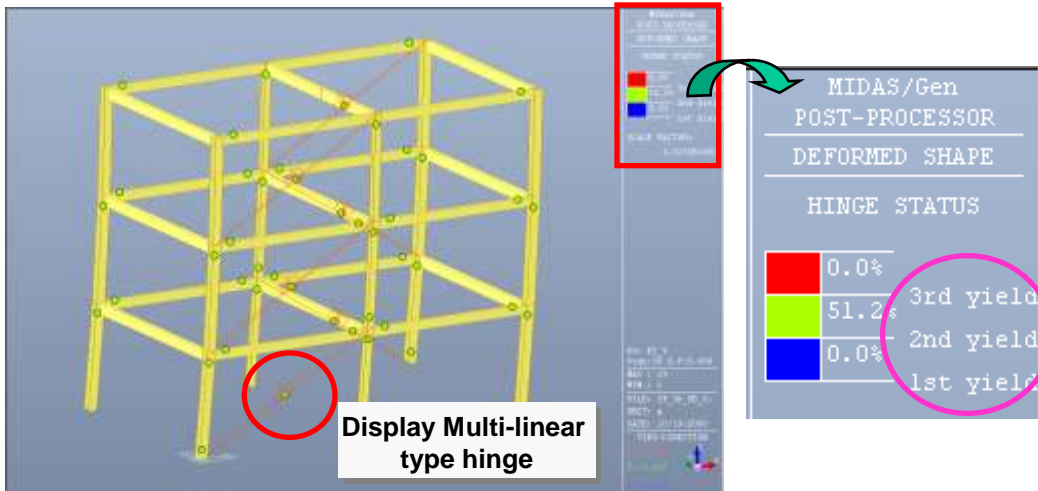
- MIDAS/Gen V.720 Online Manual
- Refer to Results > Forces > Plate Force



(2) Enhancements of Pushover Analysis Result

A. Display Hinge Status of General Link Elements

Results > *Deformations* > *Deformed Shape*



Related Functions

- Design > Pushover Analysis > [Hinge Status Table](#)

Reference

- MIDAS/Gen V.720 Online Manual
Refer to Results > Deformations > Deformed Shape

(3) Enhancements of Story Result Tables

A. The method of calculating the Story Shear Force Ratio due to Response Spectrum loads has been changed

*Results > Result Tables > Story
> Story Shear Force Ratio*

Story	Level (cm)	Load	Type	No	Angle1 ((deg))	Force1 (tonf)	Ratio1	Angle2 ((deg))	Force2 (tonf)	Ratio2	
Angle for static load case result: 0 [Deg]											
Input angle and press 'Apply' button to change angle,					0	Apply					
1F	500,000	RX(RS)	Wall	7	0,00	135,4665	0,22	90,00	0,0000	0,00	
1F	500,000	RX(RS)	Wall	6	0,00	96,8251	0,16	90,00	0,0000	0,00	
1F	500,000	RX(RS)	Wall	5	0,00	0,0000	0,00	90,00	37,4619	0,44	
1F	500,000	RX(RS)	Wall	4	0,00	89,6931	0,15	90,00	0,0000	0,00	
1F	500,000	RX(RS)	Wall	3	0,00	25,4096	0,04	90,00	0,0000	0,00	
1F	500,000	RX(RS)	Wall	2	0,00	94,2724	0,16	90,00	0,0000	0,00	
1F	500,000	RX(RS)	Wall	1	0,00	0,0000	0,00	90,00	9,4073	0,11	
1F	500,000	RX(RS)	Wall	8	0,00	0,0000	0,00	90,00	33,4247	0,39	
1F	500,000	RX(RS)	Frame	111	0,00	6,0620	0,01	90,00	0,2199	0,00	
1F	500,000	RX(RS)	Frame	110	0,00	5,7450	0,01	90,00	0,1442	0,00	
1F	500,000	RX(RS)	Frame	127	0,00	6,6658	0,01	90,00	0,3536	0,00	
1F	500,000	RX(RS)	Frame	126	0,00	5,7537	0,01	90,00	0,2176	0,00	
1F	500,000	RX(RS)	Frame	125	0,00	11,0612	0,02	90,00	0,2640	0,00	
1F	500,000	RX(RS)	Frame	124	0,00	5,8712	0,01	90,00	0,5577	0,01	
1F	500,000	RX(RS)	Frame	123	0,00	4,2690	0,01	90,00	0,5943	0,01	
1F	500,000	RX(RS)	Frame	122	0,00	10,6623	0,02	90,00	0,4565	0,01	
1F	500,000	RX(RS)	Frame	121	0,00	11,1041	0,02	90,00	0,4511	0,01	
1F	500,000	RX(RS)	Frame	120	0,00	3,9859	0,01	90,00	0,4511	0,01	
1F	500,000	RX(RS)	Frame	119	0,00	4,1711	0,01	90,00	0,4511	0,01	
1F	500,000	RX(RS)	Frame	118	0,00	10,7155	0,02	90,00	0,4511	0,01	
1F	500,000	RX(RS)	Frame	117	0,00	11,0585	0,02	90,00	0,4511	0,01	
1F	500,000	RX(RS)	Frame	116	0,00	15,4217	0,03	90,00	0,4511	0,01	
1F	500,000	RX(RS)	Frame	115	0,00	15,2465	0,03	90,00	0,4511	0,01	
1F	500,000	RX(RS)	Frame	114	0,00	10,6716	0,02	90,00	0,1018	0,00	
1F	500,000	RX(RS)	Frame	113	0,00	5,9438	0,01	90,00	0,1458	0,00	
1F	500,000	RX(RS)	Frame	112	0,00	6,1142	0,01	90,00	0,2190	0,00	
1F	500,000	RX(RS)	Frame	129	0,00	5,9514	0,01	90,00	0,1790	0,00	
1F	500,000	RX(RS)	Frame	128	0,00	6,5942	0,01	90,00	0,3184	0,00	
SUMMATION OF STORY SHEAR FORCE											
1F		RX(RS)	Frame		0,00	163,0689	0,27	90,00	5,3606	0,06	
1F		RX(RS)	Wall		0,00	441,6667	0,73	90,00	80,2940	0,94	
1F		RX(RS)	Sum		0,00	604,7355		90,00	85,6546		

Sum of the story shear forces that Frame and Wall share respectively

The sum of the ratios of Frame and Wall is 1

Related Functions

- Model > Building > **Control Data**
- Story Shear Force Ratio Check On

Reference

- MIDAS/Gen Online Manual V.720
- Refer to Results > Result Tables > Story Shear Force Ratio
- Story Shear Force due to RS loads is calculated by combining the story shear forces of each mode using the modal combination method.



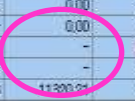
B. Enhancements of Stiffness Irregularity Check Table

Results > Result Tables > Story > Stiffness Irregularity Check

Example: **Stiffness Irregularity Check**

Load Case	Story	Level (mm)	Story Height (mm)	Story Drift (mm)	Story Shear Force (tonf)	Story Stiffness	Upper Story Stiffness		Story Stiffness Ratio	Story Drift Angle Ratio	Remark
							0.7Ku1	0.8Ku123			
RX(RS)	6F	13400.00	2600.00	0.7957	-5.30	3267.43	0.00	0.00	0.000	0.000	Regular
RX(RS)	5F	10800.00	2600.00	2.6495	-10.15	981.31	2287.20	0.00	0.425	3.530	Irregular
RX(RS)	4F	8200.00	2600.00	0.9014	-15.64	2884.29	686.92	0.00	4.199	0.340	Regular
RX(RS)	3F	5600.00	2600.00	0.6323	-20.34	3123.69	2019.01	1902.14	1.547	0.923	Regular
RX(RS)	2F	3000.00	2600.00	0.8444	-23.72	3079.25	2186.58	1863.81	1.408	1.014	Regular
RX(RS)	1F	0.00	3000.00	0.7715	-25.62	3888.55	2155.48	2423.26	1.605	0.792	Regular
RY(RS)	6F	13400.00	2600.00	0.0000	0.00	0.00	0.00	0.00	0.000	0.000	Regular
RY(RS)	5F	10800.00	2600.00	0.0000	0.00	0.00	0.00	0.00	1.349	1.053	Regular
RY(RS)	4F	8200.00	2600.00	0.0000	0.00	0.00	0.00	0.00	2.621	0.545	Regular
RY(RS)	3F	5600.00	2600.00	0.2205	6.99	11790.67	14273.15	-	0.625	1.729	Irregular
RY(RS)	2F	3000.00	2600.00	0.2532	8.51	10289.89	8253.47	-	1.244	1.140	Regular
RY(RS)	1F	0.00	3000.00	0.2552	9.32	11753.67	7188.93	11300.24	1.035	0.874	Regular

Module not defined

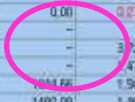


Comment

- If Story Drift is negative (-), the stiffness of the corresponding story is displayed with "-".

Module	Load Case	Story	Level (m)	Story Height (m)	Story Drift (m)	Story Shear Force (kN)	Story Stiffness	Upper Story Stiffness		Story Stiffness Ratio	Story Drift Angle Ratio	Remark
								0.7Ku1	0.8Ku123			
Right	RX(RS)	15F	30.00	3.00	0.0014	565.55	2194.30	0.00	0.00	0.000	0.000	Regular
Right	RX(RS)	13F	27.00	3.00	-0.0044	702.74	-	1536.51	0.00	0.444	3.210	Irregular
Right	RX(RS)	11F	24.00	3.00	0.0063	1840.38	479.43	-	0.00	1.002	1.408	Regular
Right	RX(RS)	9F	21.00	3.00	0.0000	0.00	0.00	35.60	-	4.032	0.204	Regular
Right	RX(RS)	7F	18.00	3.00	0.0000	0.00	0.00	6.17	-	1.504	0.950	Regular
Right	RX(RS)	10F	36.00	3.00	0.0000	0.00	0.00	0.00	0.00	0.000	0.000	Regular
Right	RX(RS)	18F	36.00	3.00	0.0018	282.56	1861.09	1321.65	0.00	1.413	1.011	Regular
Right	RX(RS)	16F	33.00	3.00	-0.0083	408.65	-	1306.96	0.00	0.275	5.172	Irregular
Right	RX(RS)	14F	30.00	3.00	0.0102	1474.64	292.69	-	-	1.233	1.233	Regular
Right	RX(RS)	12F	27.00	3.00	0.0017	1640.75	1786.79	204.89	-	3.225	0.164	Regular
Right	RX(RS)	10F	24.00	3.00	0.0018	1169.24	1837.99	1250.75	-	1.470	0.973	Regular
Right	RX(RS)	8F	21.00	3.00	0.0016	1649.56	1933.03	1396.59	1644.66	1.502	0.951	Regular
Right	RX(RS)	7F	18.00	3.00	0.0014	1905.82	2007.51	1353.12	1402.00	1.409	0.928	Regular
Base	RX(RS)	6F	15.00	3.00	0.0013	3189.66	2395.48	0.00	0.00	0.000	0.000	Regular
Base	RX(RS)	5F	12.00	3.00	0.0005	3282.80	6476.40	1695.84	0.00	3.912	0.365	Regular
Base	RX(RS)	4F	9.00	3.00	0.0010	5160.49	1846.34	4534.80	0.00	0.400	3.505	Irregular
Base	RX(RS)	3F	6.00	3.00	0.0009	5410.63	3295.95	1280.84	2851.20	1.198	0.561	Regular
Base	RX(RS)	2F	3.00	3.00	0.0007	5672.06	4399.03	2307.16	3099.39	1.418	0.743	Regular
Base	RX(RS)	1F	0.00	3.00	0.0004	5759.05	7094.00	3078.32	2544.00	2.564	0.557	Regular

Module defined





C. NG is displayed in red in the Remark column of the Story Result Tables

Results > Result Tables > Story Tables

Example: **Story Drift**

Maximum Drift of All Vertical Elements				Drift at the Center of Mass				
Story	Story Drift (ft)	Story Drift Ratio	Remark	Story Drift (m)	Modified Drift (m)	Drift Factor (Maximum/Current)	Story Drift Ratio	Remark
RMC=1, Cd/Ie=Not Used, Scale Factor=1, Allowable Ratio=0,000666667 Press right mouse button and click 'Set Story Drift Parameters...' menu to change RMC or Cd/Ie/Scale Factor/Allowable Ratio/Beta!								
11F	0,0023	0,0023	0,0006 OK	0,0022	0,0022	1,0378	0,0005 OK	
10F	0,0025	0,0025	0,0006 OK	0,0024	0,0024	1,0414	0,0006 OK	
9F	0,0026	0,0026	0,0006 OK	0,0025	0,0025	1,0434	0,0006 OK	
8F	0,0028	0,0028	0,0007 NG	0,0027	0,0027	1,0384	0,0007 OK	
7F	0,0033	0,0033	0,0008 NG	0,0032	0,0032	1,0309	0,0008 NG	
6F	0,0036	0,0036	0,0009 NG	0,0035	0,0035	1,0261	0,0009 NG	
5F	0,0038	0,0038	0,0010 NG	0,0038	0,0038	1,0223	0,0009 NG	
4F	0,0039	0,0039	0,0010 NG	0,0038	0,0038	1,0177	0,0010 NG	
3F	0,0039	0,0039	0,0010 NG	0,0038	0,0038	1,0141	0,0010 NG	
2F	0,0041	0,0041	0,0009 NG	0,0041	0,0041	1,0112	0,0009 NG	
1F	0,0035	0,0035	0,0008 NG	0,0035	0,0035	1,0125	0,0008 NG	
Base	0,0021	0,0021	0,0004 OK	0,0020	0,0020	1,0190	0,0004 OK	

Related Functions

- Story Result Tables that display NG in the Remark column
 - Story Drift
 - Story Shear Force Coefficient
 - Torsional Irregularity Check
 - Stiffness Irregularity Check
 - Weight Irregularity Check
 - Capacity Irregularity Check

Example: **Capacity Irregularity Check**

Story	Input angle and	Apply	Remark1	Story Shear Strength2 (tonf)	Upper Story Shear Strength2 (tonf)	Story Shear Strength Ratio2	Remark2
Angle = 0 [Deg]							
11F	1382,4824	0,0000	0,0000 Regular	1459,6755	0,0000	0,0000	Regular
10F	1382,4824	1382,4824	1,0000 Regular	1459,6755	1459,6755	1,0000	Regular
9F	1835,2650	1382,4824	1,3275 Regular	1459,6755	1459,6755	1,0000	Regular
8F	2046,7073	1835,2650	1,1152 Regular	1590,9289	1459,6755	1,0899	Regular
7F	1650,0829	2046,7073	0,8062 Regular	1590,9289	1590,9289	1,0000	Regular
6F	1748,4406	1650,0829	1,0596 Regular	1640,9915	1590,9289	1,0315	Regular
5F	1827,4179	1748,4406	1,0452 Regular	1697,3842	1640,9915	1,0344	Regular
4F	2069,1307	1827,4179	1,1323 Regular	2048,2023	1697,3842	1,2067	Regular
3F	27392598,9173	2069,1307	13238,6993 Regular	2137,9997	2048,2023	1,0438	Regular
2F	41088157,3694	27392598,9173	1,5000 Regular	32871041,1802	2137,9997	15374,6703	Regular
1F	41088157,3694	41088157,3694	1,0000 Regular	32871035,7020	32871041,1802	1,0000	Regular
Base	13697835,1814	41088157,3694	0,3334 Height Limit	2577,4667	32871035,7020	0,0001	Height Limit



D. Application of Module function extended to more Story Result Tables

Results > Result Tables > Story Tables

Application of Module function	Remark
<i>Story Drift</i>	Already existed
<i>Story Displacement</i>	Already existed
<i>Story Shear Forces (Response Spectrum Analysis)</i>	Newly added
<i>Story Mode Shape</i>	Already existed
<i>Story Eccentricity</i>	Newly added
<i>Story Shear Force Ratio</i>	Newly added
<i>Torsional Amplification Factor</i>	Already existed
<i>Overturning Moment</i>	Already existed
<i>Story Axial Force Sum</i>	Already existed
<i>Stability Coefficient</i>	Already existed
<i>Torsional Irregularity Check</i>	Already existed
<i>Stiffness Irregularity Check</i>	Already existed
<i>Capacity Irregularity Check</i>	Already existed





E. Level column removed from the Story Drift and Story Shear Force Coefficient Tables

Results > **Result Tables** > **Story** > **Story Drift**, **Story Drift (Time History Analysis)**, **Story Shear (Response Spectrum Analysis)** - **Story Shear Force Coefficient**

Load Case	Story	Story Height (m)	P-Delta Ratio/Mod Factor (AD)	Allowable Story Drift Ratio	Maximum Drift of All Vertical Elements				Drift at the Center of Mass			
					Node	Story Drift (cm)	Modified Drift (cm)	Story Drift Ratio	Revsok	Story Drift (cm)	Modified Drift (cm)	Drift Factor (Maximum/C-Unit)
BMC/Unit Used, C-Unit = 1.5, Scale Factor=1.2, Allowable Ratio=0.015 Press right mouse button and click 'Set Story Drift Parameters...' menu to change RAC or C-Unit/Scale Factor/Allowable Ratio/Beta!												
R/RSPROCES	10F	3.00	1.00	0.0150	361	0.0078	0.0089	0.0026 OK	0.0018	0.0013	1.1785	0.0111 OK
R/RSPROCES	10F	3.00	1.00	0.0150	362	0.0078	0.0024	0.0026 OK	0.0018	0.0021	1.1810	0.0114 OK
R/RSPROCES	11F	3.00	1.00	0.0150	0	0.0000	0.0000	0.0000 OK	0.0000	0.0000	1.0000	0.0000 OK
R/RSPROCES	11F	0.00	1.00	0.0150	0	0.0000	0.0000	0.0000 OK	-0.0014	-0.0009	1.0000	< 0.0150 OK
R/RSPROCES	11F	3.00	1.00	0.0150	0	0.0000	0.0000	0.0000 OK	0.0007	0.0003	1.0000	0.0059 OK
R/RSPROCES	11F	0.00	1.00	0.0150	0	0.0000	0.0000	0.0000 OK	-0.0011	-0.0009	1.0000	< 0.0150 OK
R/RSPROCES	11F	0.00	1.00	0.0150	0	0.0000	0.0000	0.0000 OK	0.0004	0.0002	1.0000	0.0061 OK
R/RSPROCES	11F	0.00	1.00	0.0150	0	0.0000	0.0000	0.0000 OK	-0.0007	-0.0006	1.0000	< 0.0150 OK
R/RSPROCES	11F	3.00	1.00	0.0150	0	0.0000	0.0000	0.0000 OK	0.0001	0.0000	1.0000	0.0021 OK
R/RSPROCES	11F	0.00	1.00	0.0150	0	0.0000	0.0000	0.0000 OK	-0.0006	-0.0003	1.0000	< 0.0150 OK
R/RSPROCES	11F	3.00	1.00	0.0150	0	0.0000	0.0000	0.0000 OK	0.0018	0.0008	1.0000	0.0108 OK
R/RSPROCES	11F	0.00	1.00	0.0150	0	0.0000	0.0000	0.0000 OK	-0.0002	-0.0000	1.0000	< 0.0150 OK
R/RSPROCES	11F	3.00	1.00	0.0150	190	0.0078	0.0083	0.0026 OK	0.0018	0.0008	1.0000	0.0108 OK
R/RSPROCES	11F	0.00	1.00	0.0150	161	0.0078	0.0046	0.0045 OK	0.0010	0.0003	1.0000	0.0101 OK
R/RSPROCES	11F	3.00	1.00	0.0150	128	0.0078	0.0003	0.0003 OK	0.0012	0.0000	1.0000	0.0100 OK
R/RSPROCES	11F	0.00	1.00	0.0150	91	0.0078	0.0019	0.0019 OK	0.0010	0.0004	1.0000	0.0105 OK
R/RSPROCES	11F	3.00	1.00	0.0150	85	0.0078	0.0000	0.0000 OK	0.0008	0.0004	1.0000	0.0085 OK
R/RSPROCES	11F	0.00	1.00	0.0150	1	0.0007	0.0004	0.0004 OK	0.0006	0.0007	1.0000	0.0069 OK

Module	Story	Spectrum	Shear Force				Coefficient	
			X (kN)	Y (kN)	X (kN)	Y (kN)	X	Y
Right	15F	RX(RS)	5.9372e+002	-1.1266e-006	1.9250e+003	1.9250e+003	3.0827e-001	-5.8490e-010
Right	13F	RX(RS)	1.2439e+003	-9.5847e-007	4.1895e+003	4.1895e+003	2.9884e-001	-2.2878e-010
Right	11F	RX(RS)	1.6202e+003	-2.2813e-006	6.4530e+003	6.4530e+003	2.8207e-001	-3.5935e-010
Right	9F	RX(RS)	2.2625e+003	-1.7806e-006	8.7165e+003	8.7165e+003	2.5956e-001	-2.0428e-010
Right	7F	RX(RS)	2.6003e+003	-4.9100e-006	1.0980e+004	1.0980e+004	2.3682e-001	-4.4702e-012
Left	15F	RX(RS)	0.0000e+000	0.0000e+000	6.3000e+002	6.3000e+002	0.0000e+000	0.0000e+000
Left	16F	RX(RS)	0.0000e+000	0.0000e+000	1.75e+003	1.5975e+003	1.1461e-001	-5.9095e-010
Left	16F	RX(RS)	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.6108e-001	-5.9275e-010
Left	14F	RX(RS)	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	1.9419e-001	-3.0436e-010
Left	12F	RX(RS)	1.5900e+003	-9.0136e-007	7.0920e+003	7.0920e+003	2.2420e-001	-1.2709e-010
Left	10F	RX(RS)	2.0784e+003	-2.5855e-006	9.3955e+003	9.3955e+003	2.2216e-001	-2.7422e-010
Left	8F	RX(RS)	2.4435e+003	-2.2491e-006	1.1619e+004	1.1619e+004	2.1031e-001	-1.9348e-010
Left	7F	RX(RS)	2.7288e+003	-3.7896e-007	1.3882e+004	1.3882e+004	1.9684e-001	-2.7153e-011
Base	6F	RX(RS)	2.8671e+003	-1.5575e-006	3.1814e+004	3.1814e+004	9.0120e-002	-4.9955e-011
Base	5F	RX(RS)	3.2349e+003	-1.8880e-006	3.8840e+004	3.8840e+004	8.3287e-002	-4.2945e-011
Base	4F	RX(RS)	3.6131e+003	-1.1812e-007	4.5866e+004	4.5866e+004	7.8775e-002	-2.5754e-012
Base	3F	RX(RS)	3.9891e+003	-1.4915e-006	5.2892e+004	5.2892e+004	7.5421e-002	-2.8199e-011
Base	2F	RX(RS)	4.3229e+003	-1.1485e-006	5.9918e+004	5.9918e+004	7.2146e-002	-1.9134e-011
Base	1F	RX(RS)	4.5609e+003	-3.6497e-007	6.7894e+004	6.7894e+004	6.7978e-002	-5.3914e-012

Reference

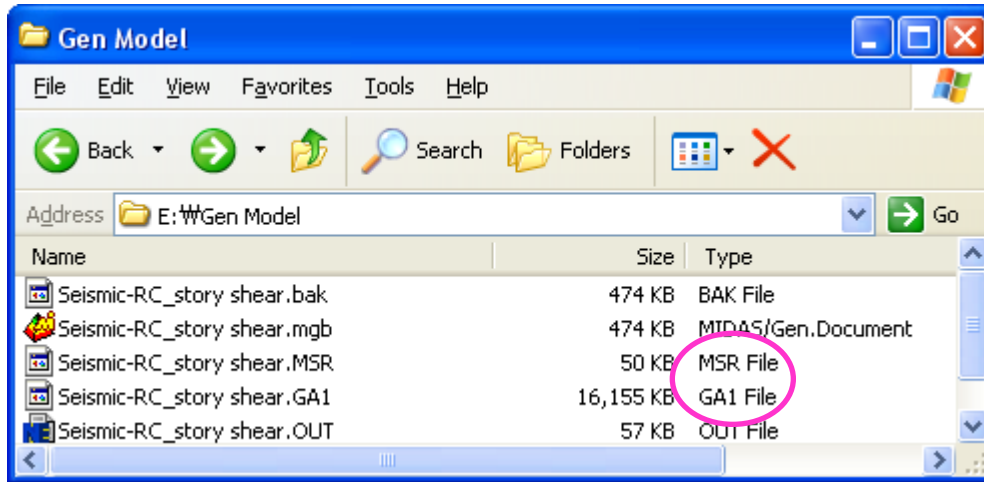
- MIDAS/Gen Online Manual V.720
 - Results > Result Tables > Story Drift
 - Results > Result Tables > Story Drift (Time History Analysis)
 - Results > Result Tables > Story Shear (Response Spectrum Analysis)

Results Part

(4) Display Story Shear Force for each Mode



Results > Result Text Output (. MSR, *. GA1)*



Related Functions

- Loads > Response Spectrum Analysis Data > **Response Spectrum Load Case**
- Analysis > **Eigenvalue Analysis Control**
- Results > Result Tables > Story > **Story Shear Force Ratio, Story Shear (Response Spectrum Analysis)**

***. MSR file**

INERTIA FORCE & STORY SHEAR FORCE OF RESPONSE SPECTRUM ANALYSIS

INERTIA FORCE & STORY SHEAR FORCE . RESPONSE SPECTRUM LOADCASE = 1

INERTIA FORCE & STORY SHEAR FORCE . **MODE NUMBER = 1** UNIT : TONF.MM

STORY ID	STORY LEVEL	INERTIA FORCE		SPRING FORCE		STORY SHEAR(N/O SPRING)		STORY SHEAR(W/ SPRING)	
		X-DIR	Y-DIR	X-DIR	Y-DIR	X-DIR	Y-DIR	X-DIR	Y-DIR
1	0.000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.7315E-01	-0.3866E+01	0.7315E-01	-0.3866E+01
2	5000.000	0.9790E-03	-0.2881E-01	0.0000E+00	0.0000E+00	0.7217E-01	-0.3837E+01	0.7217E-01	-0.3837E+01
3	9500.000	0.2721E-02	-0.7810E-01	0.0000E+00	0.0000E+00	0.6945E-01	-0.3759E+01	0.6945E-01	-0.3759E+01

INERTIA FORCE & STORY SHEAR FORCE . **MODE NUMBER = 2** UNIT : TONF.MM

STORY ID	STORY LEVEL	INERTIA FORCE		SPRING FORCE		STORY SHEAR(N/O SPRING)		STORY SHEAR(W/ SPRING)	
		X-DIR	Y-DIR	X-DIR	Y-DIR	X-DIR	Y-DIR	X-DIR	Y-DIR
1	0.000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.2010E+00	0.7207E+01	0.2010E+00	0.7207E+01
2	5000.000	0.1610E-02	0.3143E-01	0.0000E+00	0.0000E+00	0.1994E+00	0.7176E+01	0.1994E+00	0.7176E+01
3	9500.000	0.4794E-02	0.9274E-01	0.0000E+00	0.0000E+00	0.1944E+00	0.7083E+01	0.1944E+00	0.7083E+01

INERTIA FORCE & STORY SHEAR FORCE . **MODE NUMBER = 3** UNIT : TONF.MM

STORY ID	STORY LEVEL	INERTIA FORCE		SPRING FORCE		STORY SHEAR(N/O SPRING)		STORY SHEAR(W/ SPRING)	
		X-DIR	Y-DIR	X-DIR	Y-DIR	X-DIR	Y-DIR	X-DIR	Y-DIR
1	0.000	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.5997E+03	-0.3340E+01	0.5997E+03	-0.3340E+01
2	5000.000	0.5436E-01	-0.6102E-01	0.0000E+00	0.0000E+00	0.5943E+03	-0.3279E+01	0.5943E+03	-0.3279E+01
3	9500.000	0.1448E-02	-0.1596E+00	0.0000E+00	0.0000E+00	0.5798E+03	-0.3120E+01	0.5798E+03	-0.3120E+01



Contents

- (1) Serviceability Checks as per Eurocode 2 & 3**
- (2) Assign Rebars by Members**
- (3) Disregard of Extremely Small Compression/Tension in Nonlinear Members**
- (4) Enhancements of Concrete Design Result (Rebar, Area and Ratio separately displayed)**
- (5) Enhancements of Steel Design**
- (6) Enhancements of Orthogonal Effect in Seismic Load Cases**



(1) Serviceability Checks as per Eurocode 2 & 3



A. Generate Load Combinations for Serviceability Checks

Results > Combinations

Automatic Generation of Load Combination (Eurocode 2)

Option: Add Replace

Code Selection: Steel Concrete SRC Footing

Design Code: Eurocode2

Code	Servi	Add	Scale Up
CLCB25	Servi	Add	SERV:1.0D + 1.0LL + 0.6WX
CLCB27	Servi	Add	SERV:1.0D + 1.0LL + 0.6WY
CLCB28	Servi	Add	SERV:1.0D + 1.0LL - 0.6WX
CLCB29	Servi	Add	SERV:1.0D + 1.0LL - 0.6WY
CLCB30	Servi	Add	SERV:1.0D + 0.7LL + 1.0WX
CLCB31	Servi	Add	SERV:1.0D + 0.7LL + 1.0WY
CLCB32	Servi	Add	SERV:1.0D + 0.3LL + 0.2WY
CLCB37	Servi	Add	SERV:1.0D + 0.3LL - 0.2WX
CLCB38	Servi	Add	SERV:1.0D + 0.3LL - 0.2WY
CLCB39	Servi	Add	SERV:1.0D + 0.3LL + 0.0WL

Coefficients For Serviceability

	Psi0	Psi1	Psi2
Live Load :	0,7	0,5	0,3
Wind Load :	0,6	0,2	0

Automatic Generation of Load Combination (Eurocode 3)

Option: Add Replace

Code Selection: Steel Concrete SRC Footing

Design Code: Eurocode3

Scale Up Factor: 1 RY

Code	Servi	Add	Scale Up
CLCB18	Servi	Add	SERV:1.0D + 1.0LL + 0.6WX
CLCB19	Servi	Add	SERV:1.0D + 1.0LL + 0.6WY
CLCB20	Servi	Add	SERV:1.0D + 1.0LL - 0.6WX
CLCB21	Servi	Add	SERV:1.0D + 1.0LL - 0.6WY
CLCB22	Servi	Add	SERV:1.0D + 0.7LL + 1.0WX
CLCB23	Servi	Add	SERV:1.0D + 0.7LL + 1.0WY
CLCB28	Servi	Add	SERV:1.0D + 0.3LL + 0.2WY
CLCB29	Servi	Add	SERV:1.0D + 0.3LL - 0.2WX
CLCB30	Servi	Add	SERV:1.0D + 0.3LL - 0.2WY
CLCB31	Servi	Add	SERV:1.0D + 0.3LL + 0.0WL

Coefficients For Serviceability

	Psi0	Psi1	Psi2
Live Load :	0,7	0,5	0,3
Wind Load :	0,6	0,2	0

Related Function

- Design > General Design Parameters > **Serviceability Load Combination Type**

References

- MIDAS/Gen V.720 Online Manual
 - Refer to [Procedure for Serviceability Check as per Eurocode 2] in Design > Concrete Code Checking > Beam Checking
 - Refer to [Procedure for Serviceability Check as per Eurocode 3] in Design > Steel Code Check



B. Enter long term and short term Elastic Modulus Ratios

Design > Concrete Code Design > Modify Concrete Material

ID	Name	fc fck fR	Main-bar	Sub-bar
1	Girder	23.536		
2	Column	23.536		
3	Wall	23.536		

Concrete Material Selection
Code : EN(RC) Grade : C16/20
Specified Compressive Strength (fc|fck) : 16 N/mm²

Rebar Selection
Code : None
Name of Main Rebar : Fy : 0 N/mm²
Name of Sub-Rebar : Fys : 0 N/mm²

Buttons: Modify, Close

Ratio of Modulus of Elasticity

n (Short Term) : 15
n (Long Term) : 10

Buttons: OK, Close

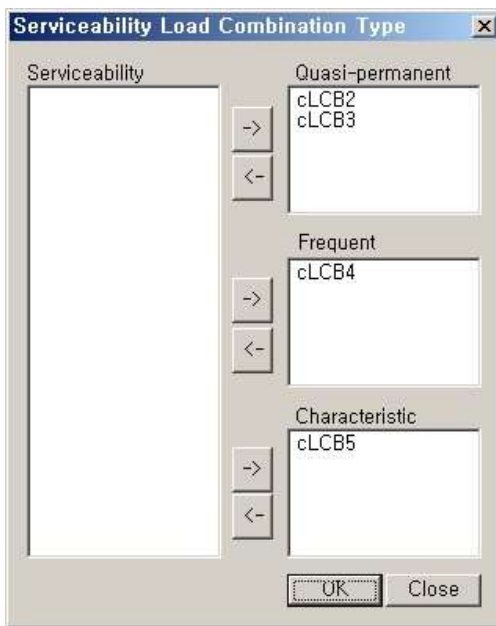
Comment & References

- Short/Long Term Elasticity Ratio
 - Default for Short Term: E_s/E_c
 - Default for Long Term: $2(E_s/E_c)$
- MIDAS/Gen V.720 Online Manual
 - Refer to [Procedure for Serviceability Check as per Eurocode 2] in Design > Concrete Code Checking > Beam Checking
 - Refer to [Procedure for Serviceability Check as per Eurocode 3] in Design > Steel Code Check



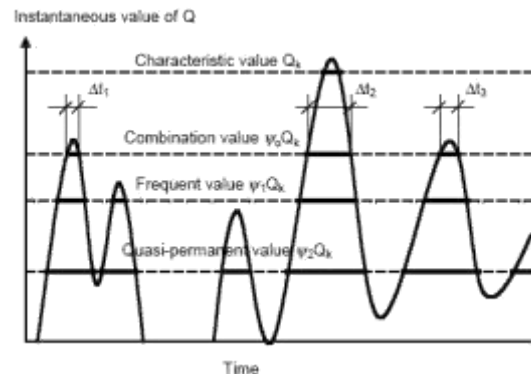
C. Assign or check Serviceability Load Combination Type

Design > General Design Parameters > Serviceability Load Combination Type



Load Combination Types for Serviceability Checks

1. Quasi-permanent
2. Frequent
3. Characteristic



Related Functions

- Results > **Combinations**

Comment & References

- Once serviceability load combinations are created by using Auto Generation of Results > Combination, the created load combinations are automatically classified into Serviceability Load Combination Type dialog box according to types.
- MIDAS/Gen V.720 Online Manual
 - Refer to [Procedure for Serviceability Check as per Eurocode 2] in Design > Concrete Code Checking > Beam Checking
 - Refer to [Procedure for Serviceability Check as per Eurocode 3] in Design > Steel Code Check



D. Enter Parameters for Serviceability Checks

Design > Concrete Design Parameters > Serviceability Parameters

Design > Steel Design Parameters > Serviceability Parameters

Related Functions

- Design > Concrete Code Checking > **Beam Checking**
- Design > **Steel Code Check**

References

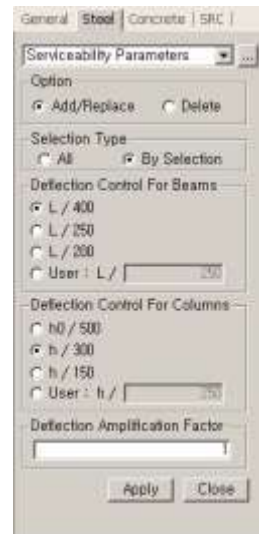
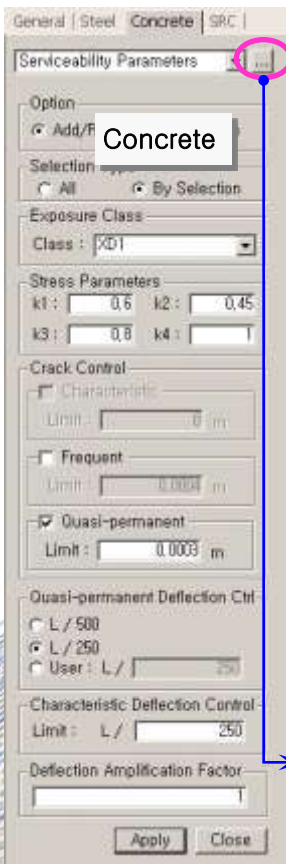
- MIDAS/Gen V.720 Online Manual
 - Refer to [Procedure for Serviceability Check as per Eurocode 2] in Design > Concrete Code Checking > Beam Checking
 - Refer to [Procedure for Serviceability Check as per Eurocode 3] in Design > Steel Code Check

Parameters for Serviceability Checks

1. Concrete (Beam)
 - Crack Control
 - Deflection Control
2. Steel (Beam, Column)
 - Deflection Control

	Elem	Type	Deflec. Control	DAF
	304	Column	300.0000	1.0000
	1490	Beam	400.0000	1.0000
	1493	Beam	400.0000	1.0000
*				

	Elem	Exposure	Stress k1	Stress k2	Stress k3	Stress k4	Crack Char.	Char. Limit	Crack Freq.	Frag. Limit	Crack Quasi. Limit	Deflec. Quasi. Limit	Deflec. Char. Limit	DAF	
	780-781		0.8000	0.4500	0.8000	1.3000	F	0.8000	F	0.0000	F	0.0000	250.0000	250.0000	1.0000
	781-781		0.8000	0.4500	0.8000	1.3000	F	0.8000	F	0.0000	F	0.0000	250.0000	250.0000	1.0000
	782-781		0.8000	0.4500	0.8000	1.3000	F	0.8000	F	0.0000	F	0.0000	250.0000	250.0000	1.0000
	783-781		0.8000	0.4500	0.8000	1.3000	F	0.8000	F	0.0000	F	0.0000	250.0000	250.0000	1.0000
	784-781		0.8000	0.4500	0.8000	1.3000	F	0.8000	F	0.0000	F	0.0000	250.0000	250.0000	1.0000
	785-781		0.8000	0.4500	0.8000	1.3000	F	0.8000	F	0.0000	F	0.0000	250.0000	250.0000	1.0000
	786-781		0.8000	0.4500	0.8000	1.3000	F	0.8000	F	0.0000	F	0.0000	250.0000	250.0000	1.0000
	787-781		0.8000	0.4500	0.8000	1.3000	F	0.8000	F	0.0000	F	0.0000	250.0000	250.0000	1.0000
	788-781		0.8000	0.4500	0.8000	1.3000	F	0.8000	F	0.0000	F	0.0000	250.0000	250.0000	1.0000
	789-781		0.8000	0.4500	0.8000	1.3000	F	0.8000	F	0.0000	F	0.0000	250.0000	250.0000	1.0000
*															





E. Serviceability Checking Results as per Eurocode 2

Design > Concrete Code Checking > Beam Checking

Eurocode2 RC-Beam Checking Result Dialog

Code : Eurocode2 Unit : tonf . m Primary Sorting Option

Sorted by: Member Property Results: Strength Serviceability

MEMB	SECT	SEL	Section		fck	fyk	POS	CHK	Stress Control								Crack Control				Deflection Control	
			Bc	Hc					Concrete				Reinforcement				Crack Control				Def	Defa
									Top-s	Top-sa	Bot-s	Bot-sa	Top-s	Top-sa	Bot-s	Bot-sa	Top-w	Top-w	Bot-w	Bot-wa		
764			G1		2400,00	I	S**	3899,06	1440,00	477,908	1440,00	31192,4	24473,2	1433,72	24473,2	0,0002	0,0003	0,0000	0,0003			
411	<input type="checkbox"/>		0,400	0,700	30591,5	M	OK	59,6857	251,240	645,147	1440,00	119,371	24473,2	3225,73	24473,2	0,0000	0,0000	0,0000	0,0003	0,0055	0,0408	
10,200			0,000	0,000	24473,2	J	SC+	15798,4	1440,00	180,682	251,240	126387	24473,2	542,045	24473,2	0,0008	0,0003	0,0000	0,0003			
765			G1		2400,00	I	SC+	16488,4	1440,00	150,022	251,240	131907	24473,2	450,065	24473,2	0,0009	0,0003	0,0000	0,0000			
411	<input type="checkbox"/>		0,400	0,700	30591,5	M	OK	70,3875	251,240	633,782	1440,00	140,775	24473,2	3168,91	24473,2	0,0000	0,0003	0,0000	0,0003	0,0054	0,0408	
10,200			0,000	0,000	24473,2	J	S**	3371,83	1440,00													
766			G1		2400,00	I	S**	4218,11	1440,00													
411	<input type="checkbox"/>		0,400	0,700	30591,5	M	OK	55,8889	251,240													

Produce Crack Control & Deflection Control results

	END-I	MID	END-J
(-) Load Combination No.	30	38	30
Crack Width(w)	11,41	0,00	45,28
Allowable Crack Width(wa)	0,20	0,00	0,20
Check Ratio(w/wa)	57,0348	*****	226,4021
(+) Load Combination No.	30	30	30
Crack Width(w)	29,22	34,46	7,72
Allowable Crack Width(wa)	0,20	0,20	0,20
Check Ratio(w/wa)	146,1180	172,3118	38,5957

5. Deflection Control

L/250 = 8,0 < 206,7 (L/10, P/S= 334, See from EN-1)..... N.G

Option for Detail Print Position: End I, Mid, End J

Comments & References

- Graphic Report
 - Crack Control
 - Deflection Control
- Detail Report
 - Stress (Strength Results)
 - Crack (Serviceability Results)
- MIDAS/Gen V.720 Online Manual
 - Refer to [Procedure for Serviceability Check as per Eurocode 2] in Design > Concrete Code Checking > Beam Checking
 - Refer to [Procedure for Serviceability Check as per Eurocode 3] in Design > Steel Code Check

Both 'Strength' (Stress) and 'Serviceability' (Crack) results are produced in the Detail Report



F. Serviceability Checking Results as per Eurocode 3

Design > Steel Code Check

Eurocode3 Code Checking Result Dialog

Code : Eurocode3 Unit : tonf , cm Primary Sorting Option

Sorted by Member Property Change... Update...

SECT MEMB

CHK	MEMB COM	SECT SHR	SEL	Section		LCB	Len	Ly	Ky	Bmy	Nsd	Mbsd	Mysd	Mzsd	Def
				Material	Fy		Lb	Lz	Kz	Bmz	N_Rd	Mb_Rd	My_Rd	Mz_Rd	Defa
NG	1496	521	<input type="checkbox"/>	SG1, H 600x200x11/17	2,40000	2	1200,00	1200,00	1,000	1,000	0,00000	-4084,4	-4084,4	0,00000	-1,0064
	2,771	0,209		SS400	2,40000		1200,00	1200,00	1,000	1,000	293,236	1474,22	6501,82	787,636	3,00000
NG	1503	523	<input type="checkbox"/>	SG3, H 400x200x8/13	2,40000	5	600,000	600,000	1,000	1,000	0,00000	1976,47	1976,47	0,00000	-0,2918
	1,160	0,245		SS400	2,40000		600,000	600,000	1,000	1,000	183,535	1704,07	2901,82	584,727	1,50000
NG	1502	525	<input type="checkbox"/>	SG5, H 582x300x12/17	2,40000	5	1080,00	1080,00	1,000	1,000	0,00000	6467,60	6467,60	0,00000	-1,0871
	1,643	0,281		SS400	2,40000		1080,00	1080,00	1,000	1,000	380,727	3935,37	8640,00	1730,18	2,70000
NG*	1675	532	<input type="checkbox"/>	SB2, H 350x175x7/11	2,40000	1	1200,00	1200,00	1,000	1,000	0,00000	1202,60	1202,60	0,00000	-4,5774
	2,815	0,118		SS400	2,40000		1200,00	1200,00	1,000	1,000	137,760	427,279	1893,82	379,636	3,00000
OK	1638	571	<input type="checkbox"/>	SCG1, H 350x175x7/11	2,40000	1	1200,000	1200,000	1,000	1,000	0,00000	-485,86	-485,86	0,00000	0,01124
	0,257	0,120													

Comments & References

- Graphic Report
- Deflection Checking Results
- Detail Report
- Check Deflection
- MIDAS/Gen V.720 Online Manual
- Refer to [Procedure for Serviceability Check as per Eurocode 2] in Design > Concrete Code Checking > Beam Checking
- Refer to [Procedure for Serviceability Check as per Eurocode 3] in Design > Steel Code Check

5. Deflection Checking Results

$L / 400.0 = 30.0 < -45.773693 \dots \dots \dots$ N.G
(LCB: 19, POS:5647.1cm, DIR:GLOBAL Z)

Produce 'Deflection Checking Results'

Connect Model View View Result Ratio...

Select All Unselect All Re-calculation <<

Graphic... Detail... Summary... Close

Display 'Check Deflection' results

```

[[[+]]] CHECK DEFLECTION.

( ). Compute Maximum Deflection.
-. LCB = 31
-. DAF = 0.000 (Deflection Amplification Factor).
-. Position = 564.706cm From i-end(Node 681).
-. Def = -3.779 * DAF = 0.000cm (Global Z)
-. Def_Lim = 0.000cm
Def > Def_Lim ---> Not Acceptable !!!
    
```

(2) Assign Rebars by Members



Design > Concrete Design Parameters > Design Criteria for Rebar by Members

Design > Concrete Design Parameters

> Concrete Design Tables > Design Criteria for Rebar by Members

General | Steel | Concrete | SRC |

Design Criteria for Rebars by ...

Beam | Column | Brace | Wall

Option
 Add/Replace Delete

Main Rebar : D22
 Stirrups : D10
 Arrangement : 2
 Side Bar : D13

dT : 0 mm
 dB : 0 mm

Doubly Reinforced : 0,5

Option of Spliced Bars
 None 50% 100%

Apply Close

Beam Rebar Table

Element	Main Rebar	Stirrups	Arrangement	Side Bar	dT (mm)	dB (mm)	Option of Sliced Bars
1	D22	D10	2	D13	0.0000	0.0000	50%
7	D22	D10	2	D13	0.0000	0.0000	50%
13	D16	D10	2	D13	0.0000	0.0000	50%
*							

Column/Brace Rebar Table

Element	Main Rebar	Ties/Spirals	Arrangement Y	Arrangement Z	d0 (mm)	Option of Sliced Bars
15	D22	D10	4	3	50.000	50%
16	D22	D10	2	2	50.000	50%
21	D22	D10	2	4	50.000	50%
22	D22	D10	2	3	50.000	50%
*						

Wall Rebar Table

Wall ID	Story	Vertical Rebar	Horizontal Rebar	End Rebar From	dE (mm)	dW (mm)
2	1F	D13	D10	D10	0.0000	0.0000
7	1F	D13	D10	D10	70.000	50.000
8	1F	D13	D10	D10	0.0000	0.0000
*						

Comment & References

- MIDAS/Gen V.720 Online Manual
 - Design > Concrete Design Parameters > Design Criteria for Rebar by Members
 - Design > Concrete Design Parameters > Concrete Design Tables > Design Criteria for Rebar by Members
- While 'Design Criteria for Rebars' enables the user to assign rebars by sections, 'Design Criteria for Rebar by Members' enables the user to assign rebars by members. 'Design Criteria for Rebar by Members' precedes 'Design Criteria for Rebars' when both are assigned.

(3) Disregard of Extremely Small Compression/Tension in Nonlinear Members

Design > Concrete Code Design > RC, Column, Wall, Brace Design

Design > SRC Code Check > Column Checking

Design > Steel Code Check

Revision of V720

In cases where tension-only/compression-only elements have extremely small compression/tension, the compression/tension forces are ignored in the design process.

Steel Design

- Compression/tension forces are ignored if they are less than $1/10000$ of (Steel Sectional Area \times F_y).
- This is identically applied to tapered sections and the area is measured at the section where the strength check is to be performed.

RC Design

- Compression/tension forces are ignored if they are less than $1/10000$ of (Concrete Area \times F_{ck}).
- Reinforcement is not taken into account since the forces are calculated before design.

SRC Design

- Compression/tension forces are ignored if they are less than $1/10000$ of (Steel Sectional Area \times F_y).
- In SRC Design, it is common to design in a way that only the steel section can resist compression and tension

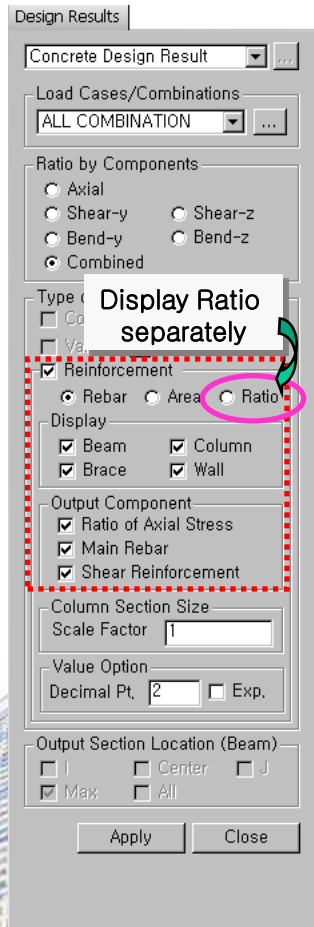
Related Functions

- Model > Elements > Create Element
[Tension Only/Hook/Cable, Compression Only/Gab](#)
- Load >
[Create Load Cases Using Load Combinations](#)
- Analysis > [Main Control Data](#)

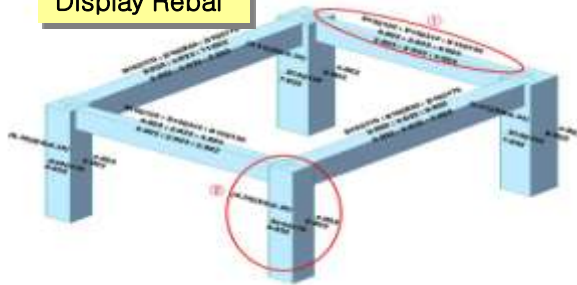
Design Part

(4) Enhancements of Concrete Design Result (Rebar, Area and Ratio separately displayed)

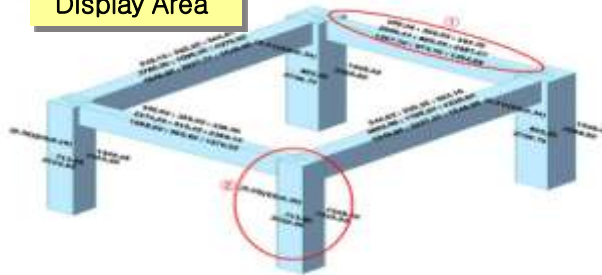
Design > Concrete Design Result



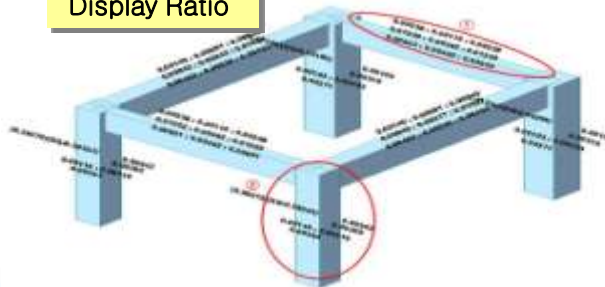
Display Rebar



Display Area



Display Ratio



Reference

- MIDAS/Gen V.720 Online Manual
- Refer to Design > Concrete Design Result

(5) Enhancements of Steel Design



A. 'Change Steel Properties Dialog' displays code checking results for all Properties

Design > Steel Code Check

The screenshot shows the 'Change Steel Properties Dialog' on the left and a 'MIDAS/Text Editor' window on the right. The dialog has a 'Test All Properties' button circled in pink. A yellow callout box with a red dashed border contains the text 'Produce the code checking results for all properties in a text format'. A red dashed box in the text editor highlights the following table:

SECTION	CHK	LCB	COM	SHR	H	B	AREA
P 60.5x4	OK	3	0.5847	0.0045	60.500	4.0000	710.00
P 76.3x2.8	OK	3	0.5583	0.0049	76.300	2.8000	646.50
P 60.5x3.2	OK	3	0.7126	0.0055	60.500	3.2000	576.00

B. Revision of Steel Code Checking Detail Calculations

Revision of V720

Old Version: Detail report used to display the calculations corresponding to the location of member and load combination, which produced the most critical combined stress.

New Version: Detail report displays the calculations corresponding to the location of member, which produces the more critical one of the most unfavorable combined stress and the most unfavorable shear stress.



(6) Enhancements of Orthogonal Effect in Seismic Load Cases

V702

- While generating static seismic load combinations with Orthogonal Effect considered, only one load combination was generated. For example, only one of [E(X), E(Y)], [E(Y),E(Z)] and [E(Z),E(X)] could be generated. (This was identically applied to Response Spectrum Loads.)

V720

- [E(X), E(Y)], [E(Y),E(Z)] and [E(Z),E(X)] can be all generated. (This is identically applied to Response Spectrum Loads.)

V710 (R2)

Group No	LC 1	LC 2
1	EQx(ST)	EQy(ST)
2	RSx(RS)	RSy(RS)

V710 (R3)

Group No	LC 1	LC 2
1	EQx(ST)	EQy(ST)
2	EQy(ST)	EQz(ST)
3	EQz(ST)	EQx(ST)

Related Function

- Results > Combinations
[Set Load Cases for Orthogonal Group](#)



Contents

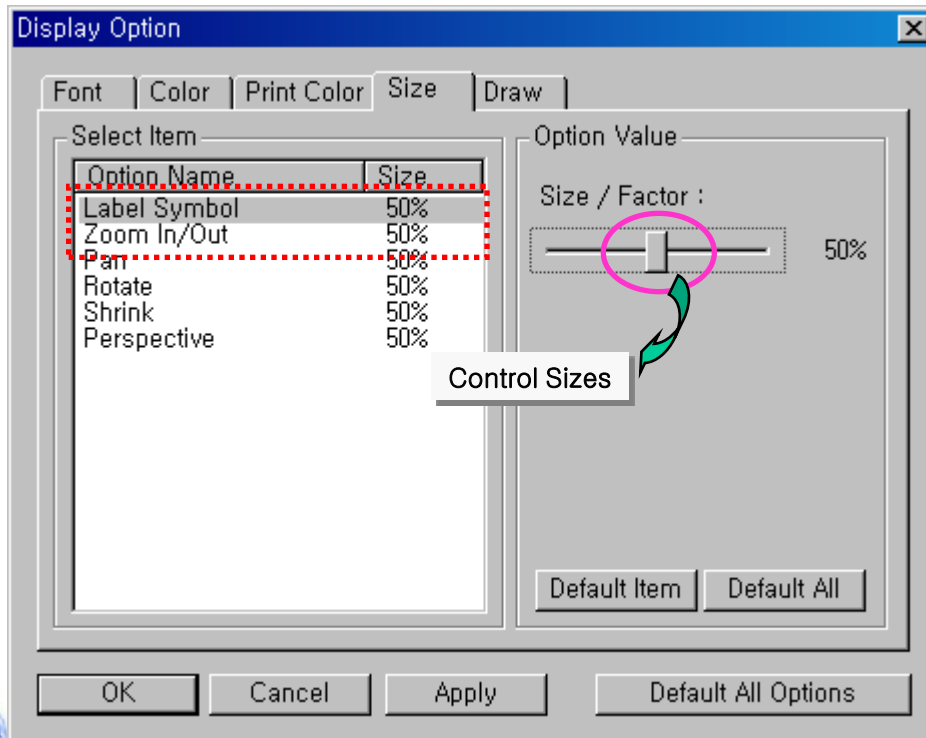
- (1) Enhancements of Display function**
- (2) Graphics Option added in Preferences Menu**
- (3) Save all Graphic Design Results as a graphic file format**



(1) Enhancements of Display function

A. Hinge Size can be controlled

View > *Display Option*



Related Functions

- Results > Deformations > **Deformed Shape**
 - Inelastic Time History Analysis Result
 - Pushover Analysis Result

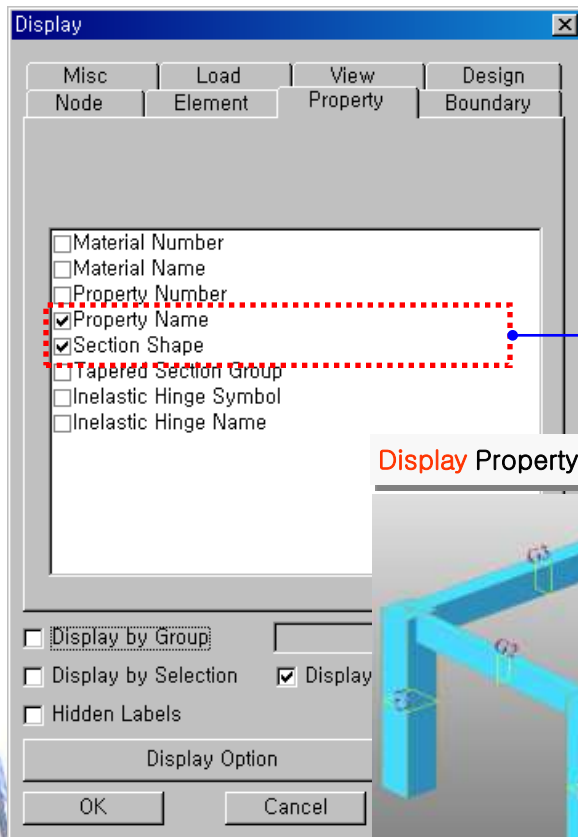
Reference

- MIDAS/Gen V.712 Online Manual
 - Refer to View > Display Option

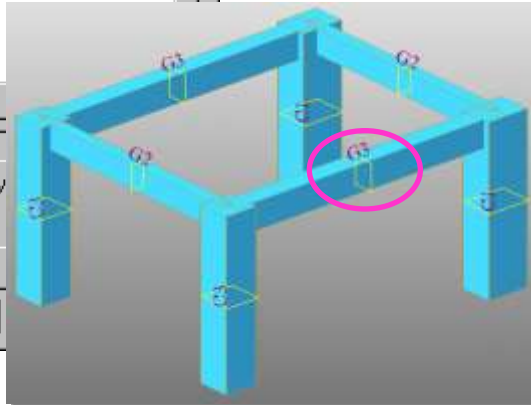


B. Simultaneously display the Section Shape and the Section Property Name

View > Display



Display Property Name and Section Shape **simultaneously**



Related Functions

- Model > Property > [Sections](#)

Reference

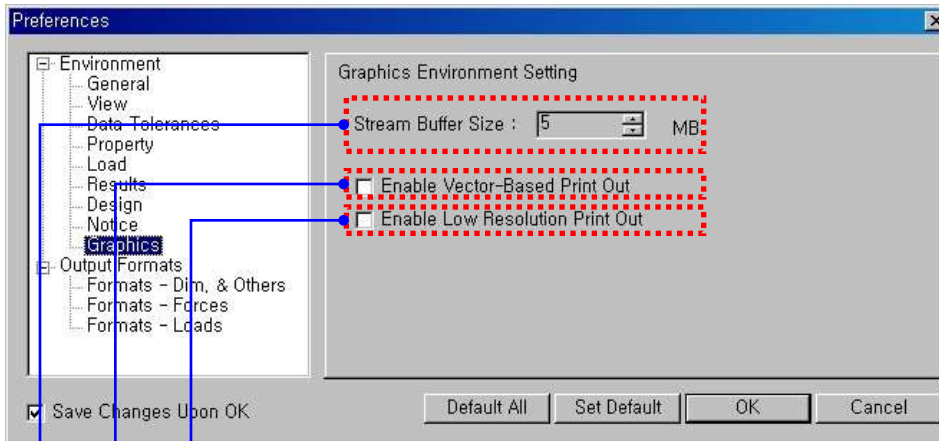
- MIDAS/Gen V.712 Online Manual
- Refer to View > Display

Miscellaneous

(2) Graphics Option added in Preferences Menu



Tools > Preference



Enable Low Resolution Print Out

Optimize the background when the Vector-Based Print Out option is enabled

Enable Vector-Based Print Out

Reduce time for printout using the Vector-Based Engine of low resolution

Stream Buffer Size

Specify the Buffer Size according to the configuration of the graphic card

Reference

- MIDAS/Gen V.720 Online Manual
- Refer to Tools > Preference

(3) Save all Graphic Design Results as a graphic file format



Design > Design Result Dialog & Code Check Result Dialog

Revision of V720

Old Version: Save the graphic design result of a single member or property

New Version: Save the graphic design results of a lot of members or properties

The screenshot shows a software window titled 'Preview Window' with a menu bar containing 'Print', 'Print All', 'Close', and 'Save'. The 'Save' button is highlighted with a pink circle. A context menu is open over the 'Save' button, listing the following options:

- Save as BMP File
- Save as EMF File
- Save All as BMP File
- Save All as EMF File

The main content area of the window is divided into three sections:

1. Design Information

Design Code: A
Unit System: b
Element No: 7
Material: C
Section Name: (Rolled - H 426x407x20.95)
Member Length: 3.60000

2. Member Forces

Axial Force: $F_{xx} = -53.185$ (LCB: 18, POS: 1)
Bending Moments: $M_y = 34.0334$, $M_z = -3.4136$
End Moments: $M_{y1} = 34.0334$, $M_{y2} = -22.784$ (for Lb)
 $M_{y1} = 34.0334$, $M_{y2} = -22.784$ (for Ly)
 $M_{z1} = -3.4136$, $M_{z2} = 2.64279$ (for Lz)
Shear Forces: $F_{yy} = -2.0594$ (LCB: 23, POS: 1)
 $F_{zz} = 15.7626$ (LCB: 18, POS: 1)

Depth	0.42600	Web Thickness	0.02000
Top F. Width	0.40700	Top F. Thick	0.03500
Bot. F. Width	0.40700	Bot. F. Thick	0.03500
Area	0.03007	A_{yz}	0.00956
I_{yy}	0.15598	I_{zz}	0.02071
I_{yy}	0.00119	I_{zz}	0.00039
I_{yy}	0.20350	I_{zz}	0.21400
I_{yy}	0.00957	I_{zz}	0.00193
I_{yy}	0.18200	I_{zz}	0.10400

3. Design Parameters

Unbraced Lengths: $L_y = 3.60000$, $L_z = 3.60000$, $L_b = 3.60000$
Effective Length Factors: $K_y = 1.00$, $K_z = 1.00$
Moment Factor / Bending Coefficient