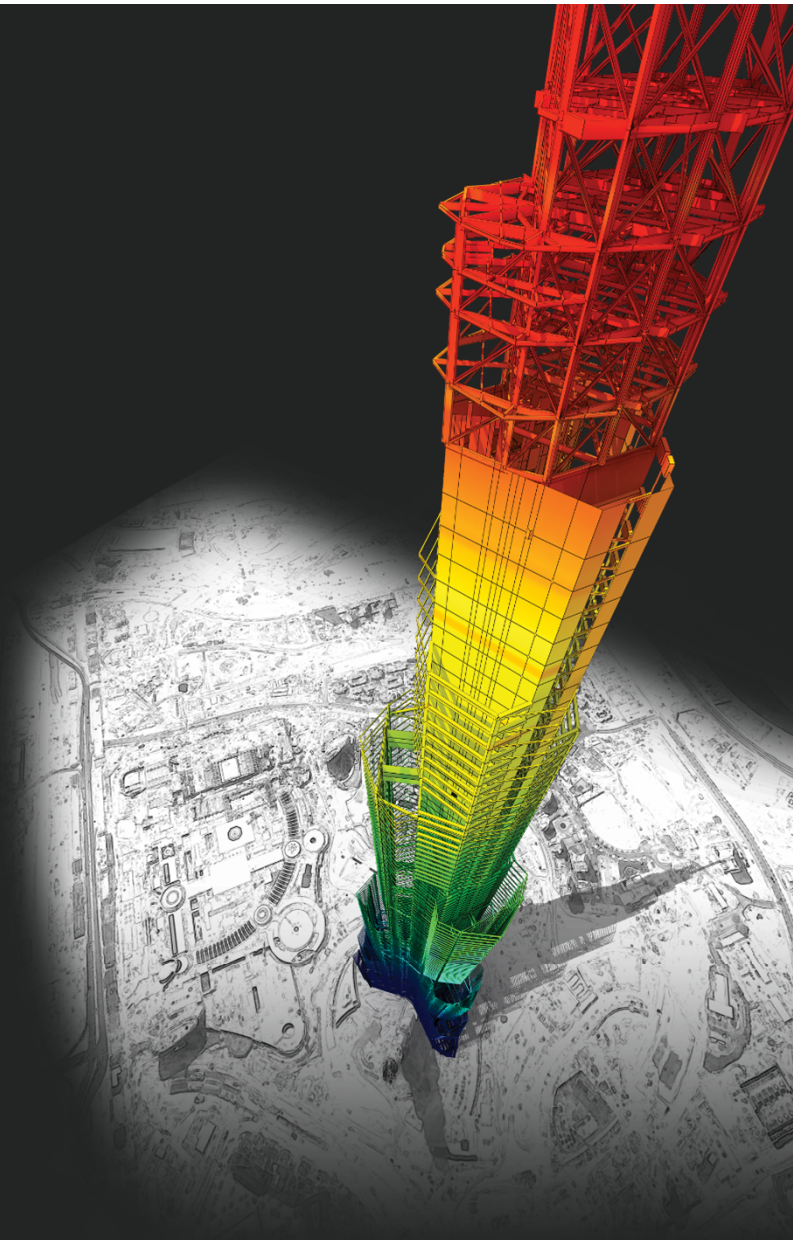


Release Note

Release Date : Nov. 2018

Product Ver. : Gen 2019 (v2.1) and Design+ 2019 (v2.1)



DESIGN OF General Structures

Integrated Design System for Building and General Structures

Index

- **midas Gen**

(1) Wizard sloshing for tank (mass adding)	4
(2) Foundation drop panel	16
(3) Check the criteria for regularity in plan as per NTC2018	18
(4) Inelastic hinge deformation result as per Eurocode8	19
(5) Improvement ductile wall design as per NTC 2018	20
(6) Pushover load pattern using story inertia force in RS analysis reference	21
(7) Check beam deflection as per ACI318-14, ACI318M-14 and NSR-10	22
(8) Add steel design as per AISC360-16	4
(9) Improvement of seismic design for ACI318-14, ACI318M-14 and NSR-10	16
(10) Add design option for strong column-weak beam check on roof	18
(11) Revit 2019 interface	19
(12) Add material DB and load combination for aluminum	20
(13) Add options of As,use and Rho,use in shell flexural checking	20

- **midas Design+**

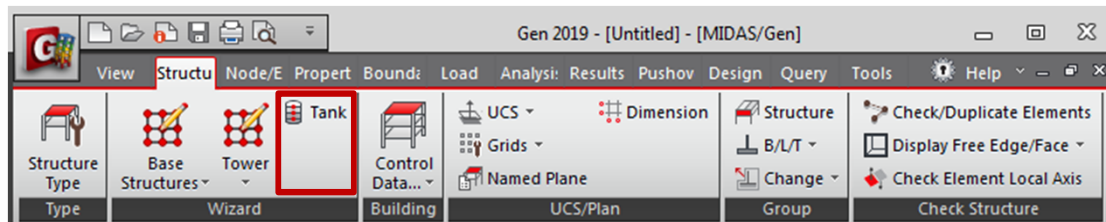
(1) Add steel design as per AISC360-16 and AISC360-16M	27
--	----

midas Gen

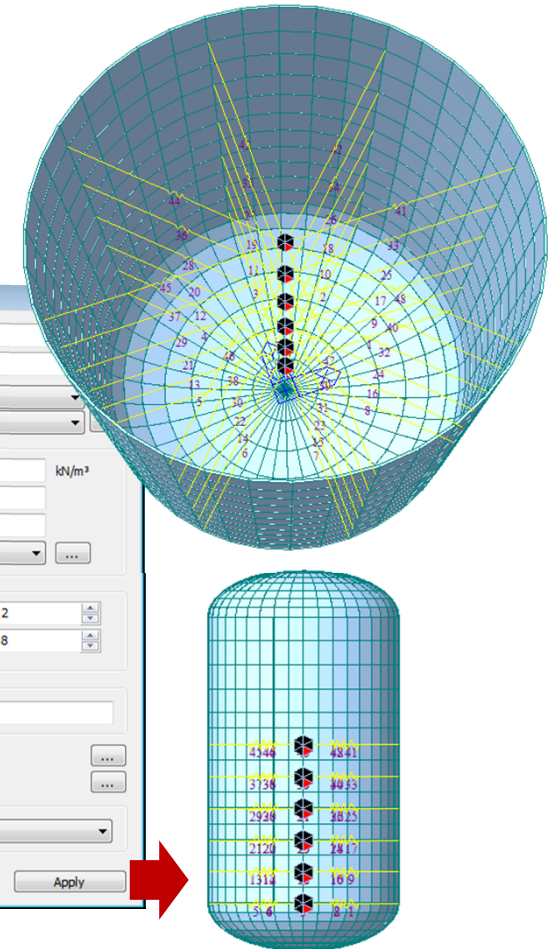
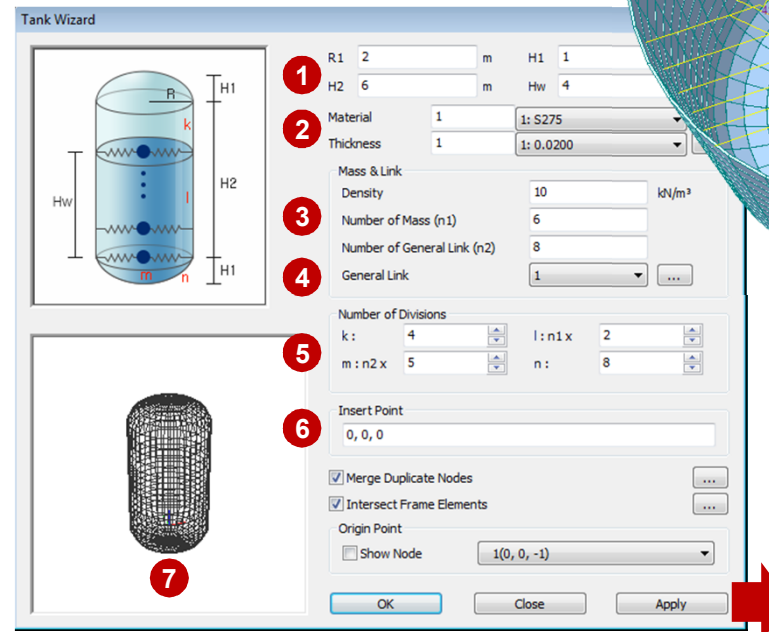
1. Wizard sloshing for tank (Mass adding)

- The wizard makes it easy to create a tank model.

Structure > Wizard > Tank

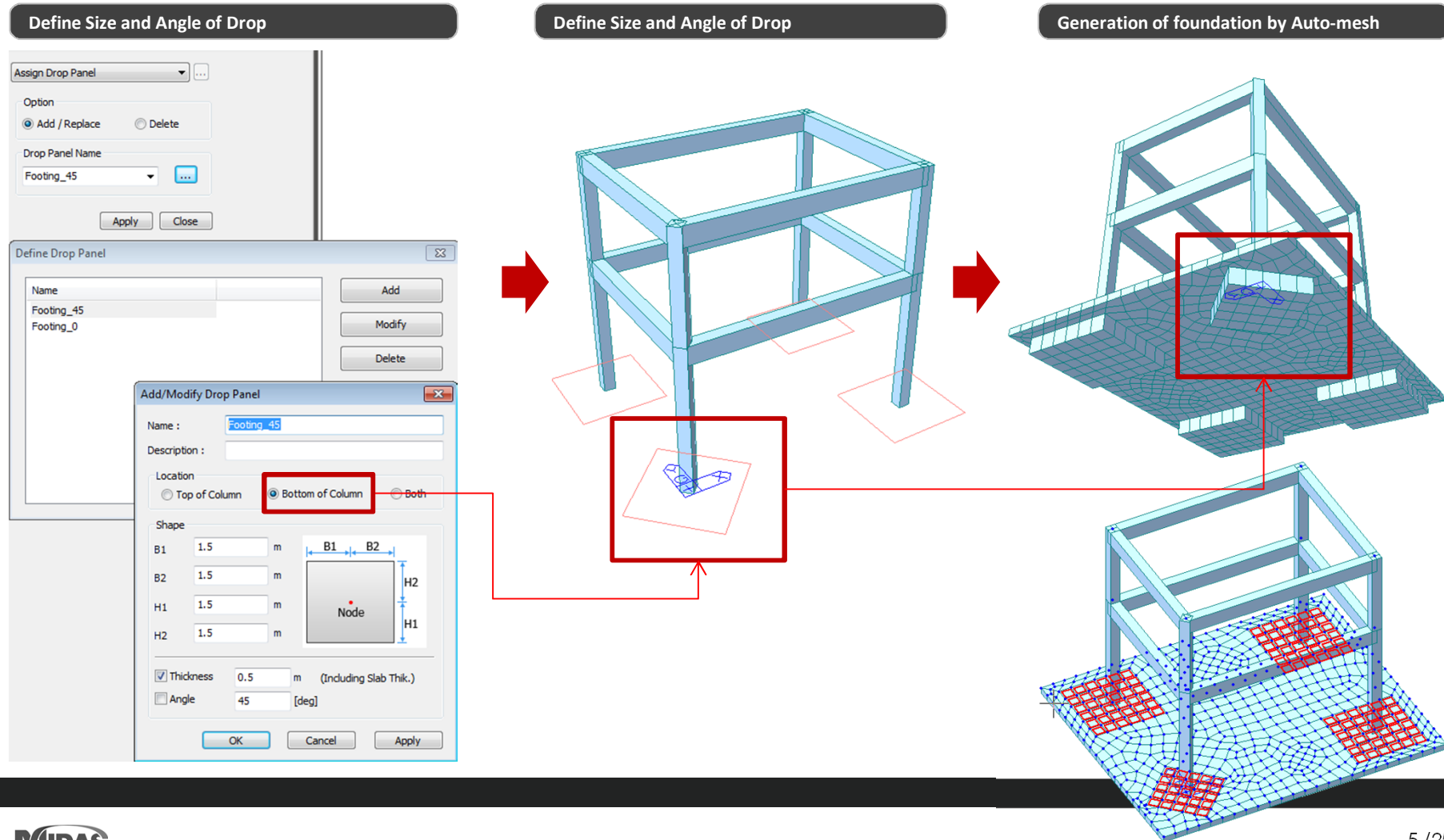


- 1 Input size(R1,H1,H2) of the tank and height(Hw) of filling.
- 2 Select the **Material** and **Thickness**.
- 3 Input **Density** of filling and **Number of Mass & General Link**.
- 4 Select **General Link**.
(Click [...] to define general link properties.)
- 5 Set **Number of Divisions** for meshing plate.
- 6 Input coordination of **Insert Point**.
- 7 Check the model shape with preview image



2. Foundation Drop Panel

- It is allowed to Install the drop panel at the bottom of the column.
- It is easy to create foundations with different thicknesses.



3. Check Criteria for Regularity in Plan as per NTC2018

Check Criteria for Regularity in Plan

EN 1998-1:2004 (E)

(7) For non-regular in elevation buildings the decreased values of the behaviour factor are given by the reference values multiplied by 0,8.

4.2.3.2 Criteria for regularity in plan

(1)P For a building to be categorised as being regular in plan, it shall satisfy all the conditions listed in the following paragraphs.

(2) With respect to the lateral stiffness and mass distribution, the building structure shall be approximately symmetrical in plan with respect to two orthogonal axes.

(3) The plan configuration shall be compact, i.e., each floor shall be delimited by a polygonal convex line. If in plan set-backs (re-entrant corners or edge recesses) exist, regularity in plan may still be considered as being satisfied, provided that these set-backs do not affect the floor in-plan stiffness and that, for each set-back, the area between the outline of the floor and a convex polygonal line enveloping the floor does not exceed 5 % of the floor area.

(4) The in-plan stiffness of the floors shall be sufficiently large in comparison with the lateral stiffness of the vertical structural elements, so that the deformation of the floor shall have a small effect on the distribution of the forces among the vertical structural elements. In this respect, the L, C, H, I, and X plan shapes should be carefully examined, notably as concerns the stiffness of the lateral branches, which should be comparable to that of the central part, in order to satisfy the rigid diaphragm condition. The application of this paragraph should be considered for the global behaviour of the building.

(5) The slenderness $\lambda = L_{max}/L_{min}$ of the building in plan shall be not higher than 4, where L_{max} and L_{min} are respectively the larger and smaller in plan dimension of the building, measured in orthogonal directions.

(6) At each level and for each direction of analysis x and y, the structural eccentricity e_s and the torsional radius r shall be in accordance with the two conditions below, which are expressed for the direction of analysis y:

$$e_{ex} \leq 0,30 \cdot r_x \quad (4.1a)$$

$$r_x \geq l_s \quad (4.1b)$$

where

e_{ex} is the distance between the centre of stiffness and the centre of mass, measured along the x direction, which is normal to the direction of analysis considered;

r_x is the square root of the ratio of the torsional stiffness to the lateral stiffness in the y direction ("torsional radius"); and

l_s is the radius of gyration of the floor mass in plan (square root of the ratio of (a) the polar moment of inertia of the floor mass in plan with respect to the centre of mass of the floor to (b) the floor mass).

Story Result Table

Define Building control

Building Control

☐ Use Ground Level
Ground Level : 0 m

☒ Consider Mass below Ground Level for Eigenvalue Analysis

☒ Story Shear Force Ratio

☒ Consider Wind and Seismic Loads for Flexible Floors

☒ Eccentricity Ratio

Story Center (Mass/Load)

☐ Use Mass ☒ Use Axial Force ☐ Use Shear Force

Load Case : EX

Scale Factor : 1

Load Case Scale Add Modify Delete

EX 1

Story Stiffness Center

X-Directional Load Case : EX

Y-Directional Load Case : EY

☐ Story Response of Time History Results

☒ Story Center

☐ Story Average

☐ Story Drift by Maximum of Vertical Elements

OK Cancel

Story Result Table

Story Drift...
Story Drift (Time History Analysis)..
Story Displacement..
Story Shear (Response Spectrum Analysis)..
Story Shear (Time History Analysis)..
Story Mode Shape..
Story Eccentricity..
Story Shear Force Ratio..
Torsional Amplification Factor..
Stability Coefficient..
Irregularity Check Parameter..
Weight Irregularity Check..
Overturning Moment..
Story Axial Force Sum..
Torsional Irregularity Check..
Criteria for Regularity in Plan..
Stiffness Irregularity Check (Weak Story)..
Capacity Irregularity Check (Weak Story)...

Select Calculation Method

Country Code : NTC2018

Story Drift Method

☒ Drift at the Center of Mass

☐ Max. Drift of Outer Extreme Points

☐ Max. Drift of All Vertical Elements

Story Stiffness Method

☒ 1 / Story Drift Ratio

☐ Story Shear / Story Drift

OK Cancel

Building Control

☐ Use Ground Level
Ground Level : 0 m

☒ Consider Mass below Ground Level for Eigenvalue Analysis

☒ Story Shear Force Ratio

☒ Consider Wind and Seismic Loads for Flexible Floors

☒ Eccentricity Ratio

Story Center (Mass/Load)

☐ Use Mass ☒ Use Axial Force ☐ Use Shear Force

Load Case : EX

Scale Factor : 1

Load Case Scale Add Modify Delete

EX 1

Story Stiffness Center

X-Directional Load Case : EX

Y-Directional Load Case : EY

☐ Story Response of Time History Results

☒ Story Center

☐ Story Average

☐ Story Drift by Maximum of Vertical Elements

OK Cancel

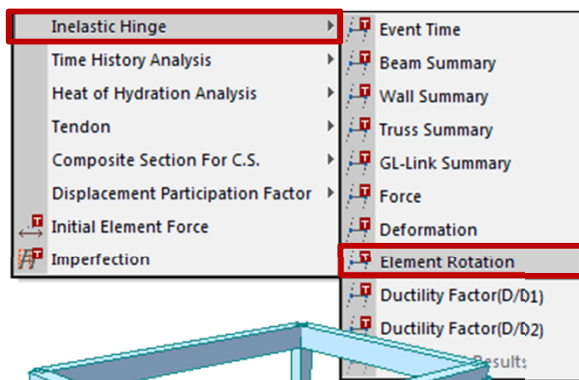
MIDAS/Gen Result [Criteria for Regularity in Plan]

Story	Level (m)	Translational Mass		Rotational Mass (N/g · m ²)	Rx (EI Radius)		X		Y		X	Y
		X-DIR (N/g)	Y-DIR (N/g)		X (m)	Y (m)	X	Y				
Roof	26.00	831405.41702	831405.41702	169004281.6555	10.34	12.06	0.5263	0.7153	Regular	Regular		
6F	22.00	773957.63175	773957.63175	155808106.2827	9.42	9.88	0.4405	0.4853	Regular	Regular		
5F	18.00	773957.63175	773957.63175	155808106.2827	9.31	9.00	0.4301	0.4020	Regular	Regular		
4F	14.00	782526.19968	782526.19968	157233873.5092	8.75	7.88	0.3810	0.3087	Regular	Regular		
3F	9.50	791094.76762	791094.76762	158658979.8772	8.54	7.22	0.3634	0.2601	Regular	Regular		
2F	5.00	799663.33556	799663.33556	160083446.6304	7.75	6.49	0.3004	0.2102	Regular	Regular		
1F	0.00	0.000000000	0.000000000	0.0000	0.00	0.00	0.0000	0.0000	Regular	Regular		

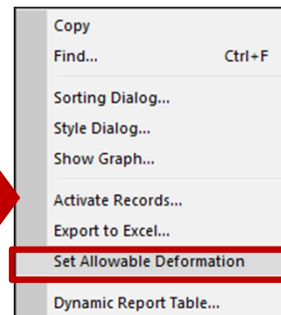
4. Inelastic Hinge Deformation Result as per Eurocode

- It is possible to check limitation of rotation for 1D element and wall.
- It is possible to confirm the damage state of the nonlinear behavior of the element by comparing it with the allowable deformation.

Check Procedure

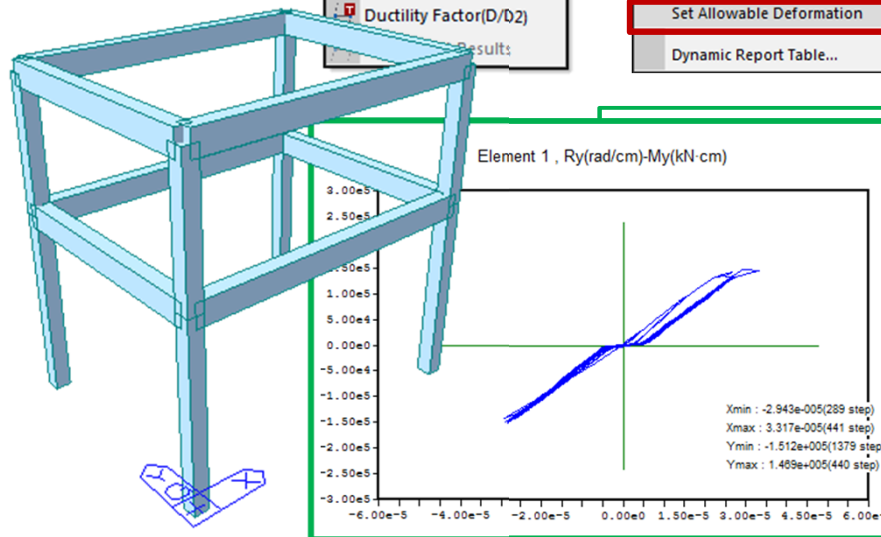


Check right mouse



Result Table - Element Rotation

Elem	Load	Part	Ry		Check	Time (sec)	Rz		Check	Time (sec)
			Rotation (rad)	Allowable (rad)			Rotation (rad)	Allowable (rad)		
1	TX(all)	I	0.000000	0.032493	OK	0.000	0.000000	0.037281	OK	0.000
1	TX(all)	J	0.000000	0.032493	OK	0.000	0.000000	0.037281	OK	0.000
4	TX(all)	I	0.000000	0.032493	OK	0.000	0.000000	0.037281	OK	0.000
4	TX(all)	J	0.000000	0.032493	OK	0.000	0.000000	0.037281	OK	0.000
16	TX(all)	I	0.000000	0.029381	OK	0.000	0.000000	0.033710	OK	0.000
16	TX(all)	J	0.000000	0.029381	OK	0.000	0.000000	0.033710	OK	0.000
20	TX(all)	I	0.000000	0.029381	OK	0.000	0.000000	0.033710	OK	0.000
20	TX(all)	J	0.000000	0.029381	OK	0.000	0.000000	0.033710	OK	0.000
32	TX(all)	I	0.000000	0.032057	OK	0.000	0.000000	0.032057	OK	0.000
32	TX(all)	J	0.000000	0.032057	OK	0.000	0.000000	0.032057	OK	0.000
33	TX(all)	I	0.000000	0.032057	OK	0.000	0.000000	0.032057	OK	0.000
33	TX(all)	J	0.000000	0.032057	OK	0.000	0.000000	0.032057	OK	0.000
36	TX(all)	I	0.000000	0.032057	OK	0.000	0.000000	0.032057	OK	0.000
36	TX(all)	J	0.000000	0.032057	OK	0.000	0.000000	0.032057	OK	0.000
37	TX(all)	I	0.000000	0.032057	OK	0.000	0.000000	0.032057	OK	0.000
37	TX(all)	J	0.000000	0.032057	OK	0.000	0.000000	0.032057	OK	0.000



$$\text{Allowable} = \theta_{um} * 3/4$$

$$\theta_{um} = \frac{1}{\gamma_{el}} 0.016 \cdot (0.3^v) \left[\frac{\max(0.01; \omega')}{\max(0.01; \omega)} f_c \right]^{0.225} \left(\frac{L_v}{h} \right)^{0.35} 25^{\left(\alpha_{px} \frac{f_{yw}}{f_c} \right)} (1.25^{100 \rho_{sl}}) \quad (A.1)$$

5. Improvement Ductile Wall Design as per NTC 2018

Allowable of setting Boundary Element Rebar Data

Design Criteria for Rebars

Design Criteria for Rebars

For Beam Design

Main Rebar : D22 Rebar...

Stirrups : D10 Arrangement : 2

Side Bar : D13

dT : 0 m dB : 0 m

☒ Consider Spacing Limit for Main Rebar

Spliced Bars : ☐ None ☒ 50% ☐ 100%

For Column Design

Main Rebar : D22 Rebar...

Ties/Spirals : D10 Arrangement : Y: 2

do : 0 m Z: 2

☒ Consider Spacing Limit for Main Rebar

Spliced Bars : ☐ None ☒ 50% ☐ 100%

For Brace Design

Main Rebar : D22 Rebar...

Ties/Spirals : D10 Arrangement : Y: 2

do : 0 m Z: 2

☒ Consider Spacing Limit for Main Rebar

Spliced Bars : ☐ None ☒ 50% ☐ 100%

For Shear Wall Design

Vertical Rebar : D10,D13 Rebar...

Horizontal Rebar : D10 End Rebar From : D13

Boundary Element Rebar : D10

Boundary Element Rebar Space : 0.2 m

de : 0.05 m dw : 0.05 m

Input Additional Wall Data...

OK Close

Design Criteria for Rebars by Member

Design Criteria for Rebars by ...

Beam | Column | Brace | Wall

Option

☒ Add/Replace ☐ Delete

Vertical Rebar : D10

Horizontal Rebar : D10

End Rebar From : D13

Boundary Element Rebar : D10

Boundary Element Rebar Space : 0.2 m

de : 0.05 m

dw : 0.05 m

Select Ductility Class

☒ DCH (High Ductility)

☐ DCM (Medium Ductility)

Modify Wall Rebar Data

Wall ID	Wall Mark	Start Story	End Story	Bar
1	W1	1F	Roof	In
2	W2	1F	Roof	-
3	W2	1F	Roof	-
4	W2	1F	Roof	-
5	W1	1F	Roof	-
6	W2	1F	Roof	-
7	W2	1F	Roof	-
8	W1	1F	Roof	-
9	W3	1F	Roof	-
10	W3	1F	Roof	-
11	W3	1F	Roof	-

☐ Create Sub Wall ID - -

Story : 1F ~ Roof

Rebar	Data
Vertical	D13 @ 350
Horizontal	D11 @ 280
End	2 4 D13 @ 100
BE Horizontal	D10 @ 200

Wall Property

Boundary Element Length : 0 m

Concrete Face to Center of Rebar(dw, de) : 0.05 , 0.05 m

☒ Use Model Thickness : 0.000 m

Add/Replace Delete Close

5. Improvement Ductile Wall Design as per NTC 2018

Improvement Shear Design of Ductile wall

Detail Report

```

=====
[[[*]]] ANALYZE SHEAR CAPACITY OF RC-WALL.
=====
( ). Compute maximum spacing of horizontal reinforcement.
  Smax = 0.300 m.

( ). Calculate shear strength of concrete.
  ~ k = MAX[ 1.0+sqrt(200/d), 2.0 ] = 1.2152 (by d unit is mm).
  ~ Acv = 1.08000 m^2.
  ~ As1 = Ast / 2 = 0.00228 m^2.
  ~ Rho1 = As1 / Acv = 0.00211
  ~ C_Rdc = 0.18/Gamma_c = 0.1200
  ~ Str_cp = MIN[ H_Ed/Ag, 0.2*fcd ] = 771.0568 KPa.
  ~ U_Rdc1 = [ C_Rdc*k*(100*Rho1*fck)^(1/3) + 0.15*Str_cp ]*Acv = 379.472 kN.
  ~ U_Rdc2 = [ 0.035*k^(3/2)*sqrt(fck) + 0.15*Str_cp ]*Acv = 351.355 kN.
  ~ U_Rdc = MAX[ U_Rdc1, U_Rdc2 ] = 379.472 kN.
  ~ U_Rdc < U_Ed ----> Shear reinforcement is required.
  ~ Umd = U_Ed-U_Rdc = 142.525 kN.

( ). Calculate required shear reinforcement. ( Asw1 = 0.00007 m^2. )
  ~ alpha_s = H_Ed / (U_Ed*Lu) = 0.02946
  ~ Asw/s1 = Umd / (0.75*f_yd*alpha_s*Lu) = 0.00386 m^2/m.
  ~ Calculate spacing s1 = 0.03692 m.
  ~ Rho_w = 0.00200 (by concrete and steel grade).
  ~ Smax = Asw / (h_w*Rho_w) = 0.28532 m.
  ~ Applied spacing s = MIN[ s1, Smax, Smax2 ] = 0.03692 m.
  ~ Asw/s = 2*Asw1 / s = 0.00386 m^2/m.

( ). Calculate shear strength of reinforcement.
  ~ alpha_s = H_Ed / (U_Ed*Lu) = 0.029
  ~ U_Rd,s = 0.75*Asw*f_yd*alpha_s/s = 105.24 kN.

( ). Check Diagonal tension failure of the web to shear.
  ~ alpha_s < 2.0
  ~ Applied spacing s (User Input) = 0.05000 m.
  ~ U_Rd,s = 0.75*Asw*f_yd*alpha_s/s = 105.24 kN.
  ~ U_Rd = U_Rdc + U_Rd,s = 484.716 kN.
  ~ U_Rd < U_Ed ----> Not Acceptable.

( ). Check ratio of shear capacity.
  ~ U_Rd,c = 379.47 kN.
  ~ U_Rd,s = 105.24 kN.
  ~ U_Rd = U_Rd,c + U_Rd,s = 484.72 kN.
  ~ Rat_U = U_Ed / U_Rd = 1.077 > 1.000 ----> Not Acceptable !

( ). Check vertical web bar capacity.
  ~ Rho_w = 0.003
  ~ Rho_h = 2*Asw1/b_w/s = 0.011
  ~ Hor = Rho_h*f_yd*b_w*0.9*d = 3858.52 kN.
  ~ Ver = Rho_w*f_yd*b_w*0.9*d + H_Ed = 2067.55 kN.
  ~ Ver < Hor ----> Not Acceptable.

```

Rebar of Web is resisting for shear strength.
 → Modify rebar space limitation
 → Change shear strength by rebar

SUMMARY RESULT OUTPUT

*Wall Mark = W1 Double Layer Rebar. <<RC-Wall Design Result>>.
 *V-Rebar : f_yk = 400 N/mm^2, H-Rebar : f_yw = 400 N/mm^2.

STO	HTw	hw	fck	f_yk	f_yw	N(kN)	M(kN-m,LCB,iWAL,Lw)	V(kN,LCB,iWAL,Lw)	AsV	V-Rebar	AswH	H-Rebar	End-Rebar	BE-Rebar	BE-Length
12F	4000	250	24	400	400	140.	404.	(1, 5, 4800)	526.	(1, 8, 7200)	713.D10@200	500.D10@280	8-D13@100	Not Use	-
11F	4000	250	24	400	400	1709.	1696.	(1, 8, 7200)	843.	(1, 8, 7200)	713.D10@200	1065.D10@130	8-D13@100	Not Use	-
10F	4000	250	24	400	400	2545.	2435.	(1, 8, 7200)	1132.	(1, 8, 7200)	713.D10@200	1643.D10@80	8-D13@100	Not Use	-
9F	4000	250	24	400	400	3356.	3053.	(1, 8, 7200)	1271.	(1, 8, 7200)	713.D10@200	1889.D10@70	8-D13@100	Not Use	-
8F	4000	250	24	400	400	4139.	3741.	(1, 8, 7200)	1450.	(1, 8, 7200)	713.D10@200	2133.D10@60	8-D13@100	Not Use	-
7F	4000	250	24	400	400	4893.	4457.	(1, 8, 7200)	1625.	(1, 8, 7200)	713.D10@200	2398.D10@50	8-D13@100	Not Use	-
6F	4000	250	24	400	400	5631.	5304.	(1, 8, 7200)	1833.	(1, 8, 7200)	713.D10@200	2785.D10@50	8-D13@100	Not Use	-
5F	4000	250	24	400	400	6091.	5805.	(1, 8, 7200)	1882.	(1, 8, 7200)	713.D10@200	2781.D10@50	8-D13@100	Not Use	-
4F	4000	250	24	400	400	6767.	7098.	(1, 8, 7200)	2189.	(1, 8, 7200)	713.D10@200	3243.D10@50	8-D13@100	Not Use	-
3F	4500	250	24	400	400	6893.	8952.	(1, 8, 7200)	2511.	(1, 8, 7200)	713.D10@200	4767.D10@50	8-D13@100	Not Use	-
2F	4500	250	24	400	400	7966.	11295.	(1, 8, 7200)	2912.	(1, 8, 7200)	713.D10@200	6675.D10@50	4-D13@150	2-D10 @56	1440.0
1F	5000	250	24	400	400	8981.	11825.	(1, 8, 7200)	2116.	(1, 8, 7200)	713.D10@200	1169.D10@120	4-D13@150	2-D10 @56	1440.0

Add rebar data of end zone

```

[[[*]]] CALCULATE HORIZONTAL REINFORCEMENT IN END ZONE
=====
( ). Compute height of the critical region.
  ~ hcr = MIN[ MAX[ Lw, HTw/5 ], MIN[ 2Lw, 2hs ] ] = 0.3333 m.
  ~ z_bot = 0.0000 m.
  ~ z_top = 5.0000 m.
  ~----> Need end horizontal reinforcement check.

( ). Compute maximum spacing of horizontal reinforcement in critical region.
  ~ Bo = bw - 2*(De-Bar/2-Sbar/2) = 0.169 m.
  ~ dbL = 0.010 m.
  ~ Smax = MIN[ Bo/3, 5*De-Bar, 125 mm ] = 0.056 m.

```

Add END ZONE Chapter

Determine whether horizontal rebar of End Zone is necessary.

Print out Space Limit of horizontal rebar of End Zone

Items	EN1998-1-1:2004			NTC2018	
	DCH (5.5)	DCM (5.4)	DCL	CD"A"	CD"B"
DIMENSION					
Thickness limit of web, $b_{w0,min}$	[EN1998-1-1:2004, 5.5.1.2.3(2)] \rightarrow [5.4.1.2.3(1)] $b_{w0} \geq \max[0.15m, h_w/20]$	[EN1998-1-1:2004, 5.4.1.2.3(1)] $b_{w0} \geq \max[0.15m, h_w/20]$		[NTC2018, 7.4.6.1.4, p.236] $b_{w0} \geq \max[0.15m, h_w/20]$	[NTC2018, 7.4.6.1.4, p.236] $b_{w0} \geq \max[0.15m, h_w/20]$
Height of critical region, h_{cr}	[EN1998-1-1:2004, 5.5.3.4.5(1)] \rightarrow [5.4.3.4.2(1)] $h_{cr} = \max[l_w, h_w/6]$ $\leq \min[2l_w, h_w, (n \leq 6), 2h_w, (n \geq 7)]$	[EN1998-1-1:2004, 5.4.3.4.2(1)] $h_{cr} = \max[l_w, h_w/6]$ $\leq \min[2l_w, h_w, (n \leq 6), 2h_w, (n \geq 7)]$		[NTC2018, 7.4.4.5.1, p.230] $h_{cr} = \max[l_w, h_w/6]$ $\leq \min[2l_w, h_w, (n \leq 6), 2h_w, (n \geq 7)]$	[NTC2018, 7.4.4.5.1, p.230] $h_{cr} = \max[l_w, h_w/6]$ $\leq \min[2l_w, h_w, (n \leq 6), 2h_w, (n \geq 7)]$
BOUNDARY ELEMENT (in critical region)					
Dimension					
Length of confined boundary, l_c	[EN1998-1-1:2004, 5.5.3.4.5(6)] \rightarrow [5.4.3.4.2(6)] $l_c \geq \max[0.15l_w, 1.5b_w]$	[EN1998-1-1:2004, 5.4.3.4.2(6)] $l_c \geq \max[0.15l_w, 1.5b_w]$		[NTC2018, 7.4.4.5.2, p.232] $l_c \geq \max[0.20l_w, 1.5b_w]$	[NTC2018, 7.4.4.5.2, p.232] $l_c \geq \max[0.20l_w, 1.5b_w]$
Mechanical volumetric ratio, ω_{wd}	[EN1998-1-1:2004, 5.5.3.4.5(4)] \rightarrow [5.4.3.4.2(4)] $\alpha\omega_{wd} \geq 30\mu\phi(v_d + \omega_d)\epsilon_{yk,d} b_w/b_o - 0.035$	[EN1998-1-1:2004, 5.4.3.4.2(4)] $\alpha\omega_{wd} \geq 30\mu\phi(v_d + \omega_d)\epsilon_{yk,d} b_w/b_o - 0.035$		[NTC2018, 7.4.6.2.4, p.238] $\alpha\omega_{wd} \geq 30\mu\phi(v_d + \omega_d)\epsilon_{yk,d} b_w/b_o - 0.035$	[NTC2018, 7.4.6.2.4, p.238] $\alpha\omega_{wd} \geq 30\mu\phi(v_d + \omega_d)\epsilon_{yk,d} b_w/b_o - 0.035$
Thickness limit b_w					
Longitudinal reinforcement ratio in the boundary elements	[EN1998-1-1:2004, 5.5.3.4.5(8)] \rightarrow [5.4.3.4.2(8)] $\rho_{min} \geq 0.005$	[EN1998-1-1:2004, 5.4.3.4.2(8)] $\rho_{min} \geq 0.005$		[NTC2018, 7.4.6.2.4, p.238] \rightarrow [7.4.6.2.2, p.237] $1\% \leq \rho \leq 4\%$	[NTC2018, 7.4.6.2.4, p.238] \rightarrow [7.4.6.2.2, p.237] $1\% \leq \rho \leq 4\%$
Confined hoop					
$d_{bw} \geq$	[EN1998-1-1:2004, 5.5.3.4.5(8)] \rightarrow [5.5.3.2.2(12)] $\geq 0.4d_{w,max} \sqrt{f_{yk,d}/f_{yk,d}}$	[EN1998-1-1:2004, 5.4.3.2.2(10)] $\geq 6mm$		[NTC2018, 7.4.6.2.2] $\geq \max[6mm, 0.4d_{w,max} \sqrt{f_{yk,d}/f_{yk,d}}]$	[NTC2018, 7.4.6.2.2] $\geq 6mm$
$s_w \geq$	[EN1998-1-1:2004, 5.5.3.4.5(8)] \rightarrow [5.5.3.2.2(12)] $\min[b_w/3, 125mm, 8d_{bw}]$	[EN1998-1-1:2004, 5.4.3.2.2(11)] $\min[b_w/2, 175mm, 8d_{bw}]$		[NTC2018, 7.4.6.2.2] $\min[b_w/3, 12.5cm, 5 \cdot 6d_{bw}]$	[NTC2018, 7.4.6.2.2] $\min[b_w/2, 17.5cm, 8d_{bw}]$
$\omega_{wd} \geq$	[EN1998-1-1:2004, 5.5.3.4.5(10)] $\omega_{wd,min} = 0.12$ (in critical region at the base) $\omega_{wd,min} = 0.08$ (in critical region above the base)	[EN1998-1-1:2004, 5.4.3.2.2(9)] \rightarrow [5.4.3.2.2(9)] \rightarrow [11] $\omega_{wd,min} = 0.08$ $d_{bw,min} = 6mm$ $s = \min[b_w/2, 175mm, 8d_{bw}]$		[NTC2018, 7.4.6.2.2] $\omega_{wd,min} = 0.12$	[NTC2018, 7.4.6.2.2] $\omega_{wd,min} = 0.08$
$\alpha\omega_{wd} \geq$	[EN1998-1-1:2004, 5.5.3.4.5(4)] \rightarrow [5.4.3.4.2(4)] $\alpha\omega_{wd} \geq 30\mu\phi(v_d + \omega_d)\epsilon_{yk,d} b_w/b_o - 0.035$	[EN1998-1-1:2004, 5.4.3.4.2(4)] $\alpha\omega_{wd} \geq 30\mu\phi(v_d + \omega_d)\epsilon_{yk,d} b_w/b_o - 0.035$ [EN1998-1-1:2004, 5.4.3.4.2(12)] $v_d \leq 0.15$		[NTC2018, 7.4.6.2.4, p.238] $\alpha\omega_{wd} \geq 30\mu\phi(v_d + \omega_d)\epsilon_{yk,d} b_w/b_o - 0.035$	[NTC2018, 7.4.6.2.4, p.238] $\alpha\omega_{wd} \geq 30\mu\phi(v_d + \omega_d)\epsilon_{yk,d} b_w/b_o - 0.035$
Transverse reinforcement detail of the boundary element by EC2					
Diagonal compression failure $V_{Rd,max}$	[EN1998-1-1:2004, 5.5.3.4.2(1)] a) outside the critical region : EN1992-1-1:2004 $z = 0.8l_w \tan\theta = 1.0$ b) in the critical region : $0.4V_{Rd,max}$			[NTC2018, 7.4.4.5.1, p.231] Verifica a taglio-compressione del calcestruzzo dell'anima a) outside the critical region : go to §4.1.2.3.5 $z = 0.8l_w \tan\theta = 1.0$ b) in the critical region : $0.4V_{Rd,max}$	[NTC2018, 7.4.4.5.1, p.231] Verifica a taglio-compressione del calcestruzzo dell'anima a) outside the critical region : go to §4.1.2.3.5 $z = 0.8l_w \tan\theta = 1.0$ b) in the critical region : $0.4V_{Rd,max}$
Diagonal tension failure	[EN1998-1-1:2004, 5.5.3.4.3] (2) $\alpha_1 \geq 2.0$: go to EN1992-1-1:2004 $V_{Rd} \leq V_{Rd,c}$: $V_{Rd} = V_{Rd,c}$ $V_{Rd} > V_{Rd,c}$: $V_{Rd} = V_{Rd,s} = A_{wt} f_{yk,d} \cot\theta/s$ (3) $\alpha_1 < 2.0$: horizontal web bars $V_{Rd} \leq V_{Rd,c} + V_{Rd,s}$ $V_{Rd,s} = 0.75\rho_f f_{yk,d} b_w \alpha_1 J_w$ (in the critical region, $V_{Rd,c}=0$, N_{Ed} is tensile)			[NTC2018, 7.4.4.5.1, p.231] Verifica a taglio-trazione dell'armatura dell'anima (2) $\alpha_1 \geq 2.0$: go to §4.1.2.3.5 $V_{Rd} \leq V_{Rd,c}$: $V_{Rd} = V_{Rd,c}$ $V_{Rd} > V_{Rd,c}$: $V_{Rd} = V_{Rd,s} = A_{wt} f_{yk,d} \cot\theta/s$ ($z = 0.8l_w \tan\theta = 1.0$) (3) $\alpha_1 < 2.0$: horizontal web bars $V_{Rd} \leq V_{Rd,c} + V_{Rd,s}$ $V_{Rd,s} = 0.75\rho_f f_{yk,d} b_w \alpha_1 J_w$ (in the critical region, $V_{Rd,c}=0$, N_{Ed} is tensile)	[NTC2018, 7.4.4.5.1, p.231] Verifica a taglio-trazione dell'armatura dell'anima (2) $\alpha_1 \geq 2.0$: go to §4.1.2.3.5 $V_{Rd} \leq V_{Rd,c}$: $V_{Rd} = V_{Rd,c}$ $V_{Rd} > V_{Rd,c}$: $V_{Rd} = V_{Rd,s} = A_{wt} f_{yk,d} \cot\theta/s$ ($z = 0.8l_w \tan\theta = 1.0$) (3) $\alpha_1 < 2.0$: horizontal web bars $V_{Rd} \leq V_{Rd,c} + V_{Rd,s}$ $V_{Rd,s} = 0.75\rho_f f_{yk,d} b_w \alpha_1 J_w$ (in the critical region, $V_{Rd,c}=0$, N_{Ed} is tensile)
Sliding Failure	[EN1998-1-1:2004, 5.5.3.4.4] (1) $V_{Ed} \leq V_{Rd,s}$ (2) $V_{Rd,s} = V_{Ed} + V_{Ed} + V_{Ed}$			[NTC2018, 7.4.4.5.1, p.231] Verifica a scorrimento nelle zone dissipative (1) $V_{Ed} \leq V_{Rd,s}$ (2) $V_{Rd,s} = V_{Ed} + V_{Ed} + V_{Ed}$	[NTC2018, 7.4.4.5.1, p.231] Verifica a scorrimento nelle zone dissipative (1) $V_{Ed} \leq V_{Rd,s}$ (2) $V_{Rd,s} = V_{Ed} + V_{Ed} + V_{Ed}$
BOUNDARY ELEMENT (over the rest of the wall height)					
Above the critical region	[EN1998-1-1:2004, 5.5.3.4.5(12)] \rightarrow [5.4.3.4.2(11)] Go to EN1992-1-1:2004 $\rho_{vert,min} = 0.005$	[EN1998-1-1:2004, 5.4.3.4.2(11)] Go to EN1992-1-1:2004 $\rho_{vert,min} = 0.005$			
WEB REINFORCEMENT					
Vertical reinforcement					
$\rho_{v,min}$	[EN1998-1-1:2004, 5.5.3.4.5(13)] 0.002		[EN1992-1-1:2004, 9.6.2(1)] 0.002	[NTC2018, 7.4.6.2.4, p.238] 0.002	[NTC2018, 7.4.6.2.4, p.238] 0.002
$\rho_{v,max}$			[EN1992-1-1:2004, 9.6.2(1)] 0.04		
$d_{bw,min}$	[EN1998-1-1:2004, 5.5.3.4.5(15)] 8mm				
$d_{bw,max}$	[EN1998-1-1:2004, 5.5.3.4.5(15)] $b_w/8$			[NTC2018, 7.4.6.2.4] $b_w/10$	[NTC2018, 7.4.6.2.4] $b_w/10$
$s_{v,max}$	[EN1998-1-1:2004, 5.5.3.4.5(15)] $\min[250mm, 25d_{bw}]$		[EN1992-1-1:2004, 9.6.2(3)] $\min[3 \cdot b_w, 400mm]$	[NTC2018, 7.4.6.2.4] 30cm	[NTC2018, 7.4.6.2.4] 30cm
Horizontal reinforcement					
$\rho_{h,min}$	[EN1998-1-1:2004, 5.5.3.4.5(13)] 0.002		[EN1992-1-1:2004, 9.6.3(1)] $A_{h,min} = \max[0.25A_{tw}, 0.001A_c]$	[NTC2018, 7.4.6.2.4, p.238] 0.002	[NTC2018, 7.4.6.2.4, p.238] 0.002
$d_{bh,min}$	[EN1998-1-1:2004, 5.5.3.4.5(15)] 8mm				
$d_{bh,max}$	[EN1998-1-1:2004, 5.5.3.4.5(15)] $b_w/8$			[NTC2018, 7.4.6.2.4] $b_w/10$	[NTC2018, 7.4.6.2.4] $b_w/10$
$s_{h,max}$	[EN1998-1-1:2004, 5.5.3.4.5(15)] $\min[250mm, 25d_{bh}]$		[EN1992-1-1:2004, 9.6.3(2)] 400mm	[NTC2018, 7.4.6.2.4] 30cm	[NTC2018, 7.4.6.2.4] 30cm
NORMALIZED AXIAL FORCE					
v_d	[EN1998-1-1:2004, 5.5.3.4.1(2)] $v_d \leq 0.35$	[EN1998-1-1:2004, 5.4.3.4.1(2)] $v_d \leq 0.4$		[7.4.4.5.1, p.230] $v_d \leq 0.4$	[7.4.4.5.1, p.230] $v_d \leq 0.35$

6. Pushover Load Pattern using story inertia force in RS analysis reference

- The load patterns can be created by converting response spectrum load to static load.

Procedure for generating Load Pattern

Step 1 : Create Static Seismic Load from RS force

Check right mouse

Dynamic Report Table...

Create Static Seismic Load From RS Inertia Forces

Spectrum Load Cases

☒ RX
☒ RY

OK Cancel

Step 3 : Select Static Load case > RS Inertia

Load Case(Qud)

Load Type : Static Load Cases

Load Case : RX Inertia Scale Factor : 1

Add Modify Delete

Load Scale

RX Inertia 1

Step 2 : Check Addition of Converted Load

Static Load Cases

Name : RX Inertia Type : Earthquake (E) Description : Inertia Force For RX

Add Modify Delete

Name	Type	Description
DL	Dead Load (D)	
LL	Live Load (L)	
WX	Wind Load on Structure (W)	
WX	Wind Load on Structure (W)	
RX Inertia	Earthquake (E)	Inertia Force For RX
RY Inertia	Earthquake (E)	Inertia Force For RY

Static Loads

- Static Load Case 1 [DL :]
 - Self Weight [SZ=1]
- Element Beam Loads : 144
- Floor Loads : 36
- Static Load Case 2 [LL :]
 - Element Beam Loads : 144
 - Floor Loads : 36
- Static Load Case 3 [WX :]
 - Wind Loads [KBC(2009)]
- Static Load Case 4 [WY :]
 - Wind Loads [KBC(2009)]
- Static Load Case 5 [RX Inertia : Inertia Force For RX]
 - Static Seismic Loads [Eurocode-8(2004)]
- Static Load Case 6 [RY Inertia : Inertia Force For RY]
 - Static Seismic Loads [Eurocode-8(2004)]
- Response Spectrum Analysis
 - Response Spectrum Functions : 1
 - Response Spectrum Load Cases : 2

Add Static Load by RC

Add Static Load Case

7. Check Beam Deflection as per ACI318-14, ACI318M-14 and NSR-10

- The calculation of deflection takes into account cracked section and long-term behavior.
- The ratio of the analysis results considering the long-term deflection coefficient to the allowable displacement is provided.

Check on Deflection Option in Design Setting

Concrete Design Code

Design Code : ACI318M-14

☒ Check Beam Deflection

☐ Apply Special Provisions for Seismic Design

☐ Torsion Design

Torsion Reduction Factor for Beam : 1

Moment Redistribution Factor for Beam : 1

OK Close

Setting Design Parameter

General Steel Concrete SRC Cold Fo

Serviceability Parameters

Option

☒ Add/Replace ☐ Delete

Selection Type

☐ All ☒ By Selection

Deflection Control

☐ L / 480

☒ L / 360

☐ L / 240

☐ L / 180

☐ User : L / 500

Long-Term Deflection Control

Live Load Reduction Factor

0.5

Time-Dependent Factor

5 years or more

(xi : 2)

☒ L / 480

☐ L / 360

☐ L / 240

☐ L / 180

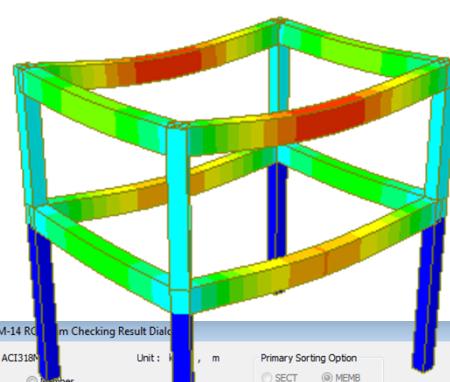
☐ User : L / 500

Deflection Amplification Factor

1

Apply Close

Deflection Check in Design result table



ACI318M-14 RC Form Checking Result Dialog

Code : ACI318M Unit : m Primary Sorting Option

Sorted by ☒ Member ☐ Property

MEMB	SECT	SE L	Bc	Hc	fy	fys	PO S	K	AsTop	AsBot	N(-) Mu	LC B	N(-) qMn	Rat-N	P(+/-) Mu	LC B	P(+/-) qMn	Rat-P	Vu	LC B	qVc	Rat-V	Deflection							
																							Short-Time Def	Long-Time Def	Rat-D	Rat-D				
0									0.0008	0.0009	126.056	1	174.506	0.72	79.9023	1	174.506	0.46	108.600	1	136.808	0.1								
1			0.400	0.600	400000				0.0009	0.0009	81.2857	1	174.506	0.47	155.702	1	174.506	0.89	72.3600	1	136.808	0.7								
8.0000			0.000	0.000	400000				0.0009	0.0009	126.056	1	174.506	0.72	79.9023	1	174.506	0.46	108.600	1	136.808	0.1								

24.2.3 Calculation of immediate deflections

24.2.3.4 Modulus of elasticity, E_c , shall be permitted to be calculated in accordance with 19.2.2.

24.2.3.5 For nonprestressed members, effective moment of inertia, I_e , shall be calculated by Eq. (24.2.3.5a) unless obtained by a more comprehensive analysis, but I_e shall not be greater than I_g .

$$I_e = \left(\frac{M_{cr}}{M_a} \right)^3 I_g + \left[1 - \left(\frac{M_{cr}}{M_a} \right)^3 \right] I_{cr} \quad (24.2.3.5a)$$

where M_{cr} is calculated by

$$M_{cr} = \frac{f_r I_g}{y_t} \quad (24.2.3.5b)$$

24.2.4.1.1 Unless obtained from a more comprehensive analysis, additional time-dependent deflection resulting from creep and shrinkage of flexural members shall be calculated as the product of the immediate deflection caused by sustained load and the factor λ_Δ

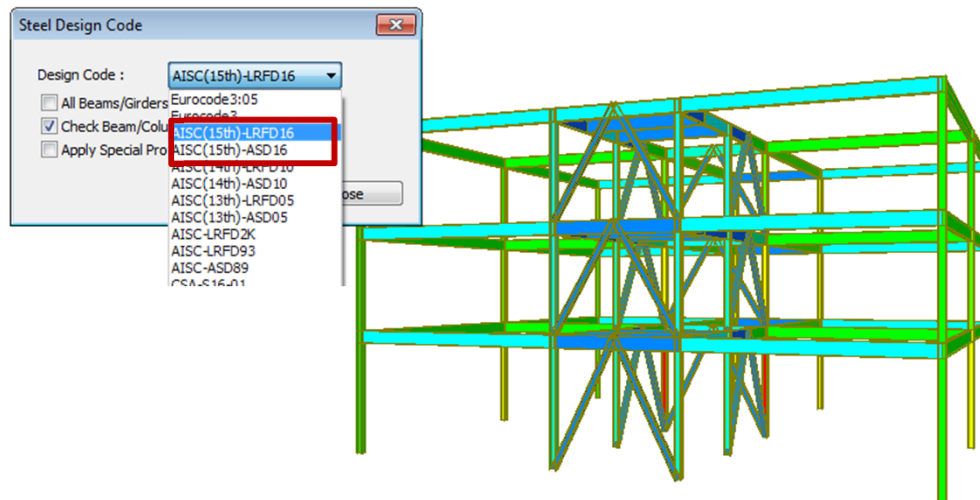
$$\lambda_\Delta = \frac{\xi}{1 + 50\rho'} \quad (24.2.4.1.1)$$

sustained loads

Sustained load duration, months	Time-dependent factor ξ
3	1.0
6	1.2
12	1.4
60 or more	2.0

8. Add Steel Design as per AISC360-16

Steel Design as per AISC360-16



Design Result Table

AISC(15th)-LRFD16 Code Checking Result Dialog

Code: AISC(15th)-LRFD16 Unit: kN, m Primary Sorting Option: SECT

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

CH	MEMB	SECT	SE	Section	LCB	Len	Ly	Cb	Ky	B1y	B2y	Pr	Mry	Mrz	Vry	Vrz	Tr	Def
K	COM	SHR	L	Material	Fy	Lb	Lz		Kz	B1z	B2z	Pc	McY	McZ	VcY	VcZ	Tc	Defa
NG	73	101		C1	2	6.00000	6.00000	1.000	1.000	1.193	1.000	-2869.8	-135.88	276.935	-14.171	28.0349	0.00000	-
	2.966	0.055		A572-50	344738	6.00000	6.00000		1.000	4.881	1.000	2193.00	363.038	185.894	1563.73	509.867	0.00000	-
NG	226	221		SG1	2	12.00000	12.00000	1.000	1.000	1.000	1.000	0.00000	-811.02	0.00000	0.00000	-388.13	0.00000	-
	1.264	0.384		A36	248211	4.00000	12.00000		1.000	1.000	1.000	3228.34	641.661	104.696	0.00000	1011.24	0.00000	-
OK	106	1001		BR1	6	6.70820	6.70820	1.000	1.000	1.070	1.000	-405.00	0.00000	0.00000	0.00000	0.00000	0.00000	-
	0.278	0.000		A36	248211	6.70820	6.70820		1.000	1.236	1.000	1454.79	243.208	128.125	0.00000	0.00000	0.00000	-

Graphic Report (Summary Report)

Preview Window

Prop No: 1001 Print Print All Close Save

1. Design Information

Design Code: AISC(15th)-LRFD16
 Unit System: kN, m
 Member No: 106
 Material: A36 (No.4)
 Section Name: BR1 (No.1001)
 Member Length: 6.70820

2. Member Forces

Axial Force: Fx = -405.00
 Bending Moments: My = 0.00000
 End Moments: My1 = 0.00000
 Shear Forces: Fy = 0.00000
 Fz = 0.00000

3. Design Parameters

Unbraced Lengths: Effective Length Factors: Moment Factor / Bending Coefficient: $KL/r = 102.8 < 200.0$

4. Checking Results

Slenderness Ratio: $KL/r = 102.8 < 200.0$
 Axial Strength: $Pr/Pc = 405.00/1454.79$
 Bending Strength: $Mry/Mcy = 0.000/243.208$
 Combined Strength (Compression+Bending): $Pr/Pc = 0.28 > 0.20$
 Shear Strength: $Vry/Vcy = 0.000 < 1.0$
 $Vrz/Vcz = 0.000 < 1.0$

Detail Report

MIDAS/Text Editor: [Appl_Steel.acs]

midas Gen - Steel Code Checking[AISC(15th)-LRFD16] Gen 2019

PROJECT : MEMBER NO = 106, ELEMENT TYPE = Truss
 LOADCOMB NO = 6, MATERIAL NO = 4, SECTION NO = 1001
 UNIT SYSTEM : kN, m

SECTION PROPERTIES : Designation = BR1
 Shape = I - Section, (Rolled)
 Depth = 0.256, Top F Width = 0.256, Bot F Width = 0.256
 Web Thick = 0.011, Top F Thick = 0.017, Bot F Thick = 0.017

Area = 1.13548e-002, Asy = 5.89625e-003, Asz = 2.76928e-003
 Vbar = 1.28816e-001, Zbar = 1.29794e-001, Qyb = 5.65548e-002, Qzb = 8.19405e-003
 Syy = 1.89482e-003, Szz = 3.76942e-004, Zyy = 1.22247e-003, Zzz = 5.73547e-004
 Iyy = 1.41952e-004, Izz = 4.82828e-005, Iyz = 8.00000e-006
 ry = 1.11586e-001, rz = 6.52788e-002
 J = 1.63225e-006, Cwp = 7.08756e-007

DESIGN PARAMETERS FOR STRENGTH EVALUATION :
 Ly = 6.70820e+000, Lz = 6.70820e+000, Lu = 6.70820e+000
 Ky = 1.00000e+000, Kz = 1.00000e+000

MATERIAL PROPERTIES :
 Fy = 2.48211e+005, Es = 1.99948e+008, MATERIAL NAME = A36

COMPUTE MOMENT MODIFICATION FACTORS AND MODIFIED MOMENTS.

Factored force/moments caused by unit load case.

Load combination ID = 6

Load Case	Pa	My1	My2	Mz1	Mz2
DL	-41.88	0.00	0.00	0.00	0.00
LL	-25.85	0.00	0.00	0.00	0.00
DL+LL	-67.73	0.00	0.00	0.00	0.00
OTHER CASES	-337.27	0.00	0.00	0.00	0.00
TOTAL	-405.00	0.00	0.00	0.00	0.00

Member end moments caused by gravity load(DL+LL).
 My1C = 0.00, My2C = 0.00
 Mz1C = 0.00, Mz2C = 0.00

Compute coefficient assuming no lateral translation of the frame (Cmy, Cnz)
 [AISC(15th) Specification Eq.16.1-1b. (C2-4)]
 Cmy = 1.000 (User defined or default value)
 Cnz = 1.000 (User defined or default value)

Ready Ln 144 / 300, Col 90 NUM

9. Improvement of Seismic Design for ACI318-14, ACI318M-14 and NSR-10

Concrete Design Code

Design Code : ACI318-14

☒ Apply Special Provisions for Seismic Design

Select Frame Type

☐ Special Moment Frames

☒ Intermediate Moment Frames

☐ Ordinary Moment Frames

Shear Wall Type

☐ Special RC Structural Wall

Boundary Element Method

☒ $c \geq lw/600 (1.55u/hw)$

Deflection Amplification Factor (Cd) 4.50

Important Factor (Ie) 1.25

☐ $fc \geq 0.2fck$

Shear for Design

Update by Code

Method

☐ MAX(Ve1,Ve2) ☒ MIN(Ve1,Ve2) ☐ Ve1 ☐ Ve2

Ve1, Vg + a1*SUM(Mn)/L, a1 = 1

Ve2, Vg + a2*VeQ, a2 = 2

Member Types to be excluded in Seismic Design

☒ Sub-Beam ☒ Cantilever

☒ Underground Beam/Column

☐ Torsion Design

Torsion Reduction Factor for Beam : 1

Moment Redistribution Factor for Beam : 1

OK Close

Design setting in Gen2019 v1.1

Concrete Design Code

Design Code : ACI318-14

☐ Check Beam Deflection

☒ Apply Special Provisions for Seismic Design

Select Frame Type

☐ Special Moment Frames

☒ Intermediate Moment Frames

☐ Ordinary Moment Frames

☐ Consider strong column-weak beam on last floor

Shear Wall Type

☐ Special RC Structural Wall

Boundary Element Method

☒ $c \geq lw/600 (1.55u/hw)$

Deflection Amplification Factor (Cd) 4.50

Important Factor (Ie) 1.25

☐ $fc \geq 0.2fck$

Shear for Design

Update by Code

Method

☐ MAX(Ve1,Ve2) ☒ MIN(Ve1,Ve2) ☐ Ve1 ☐ Ve2

Ve1, Vg + a1*SUM(Mn)/L, a1 = 1

Ve2, Vg + a2*VeQ (Beam), a2 = 2

Ve2, Vg + a2*VeQ (Column), a2 = 2

☐ Beam-Column Joint Design

Member Types to be excluded in Seismic Design

☒ Sub-Beam ☒ Cantilever

☒ Underground Beam/Column

☐ Torsion Design

Torsion Reduction Factor for Beam : 1

Moment Redistribution Factor for Beam : 1

Design setting in Gen2019 v2.1

In the seismic design, the Amplification factor (a2) can be separately applied to calculate the shear force of the column and beam.

10. Add Design Option for Strong Column-Weak Beam Check on Roof

Concrete Design Code

Design Code : ACI318-14

☒ Apply Special Provisions for Seismic Design

Select Frame Type

☐ Special Moment Frames
☒ Intermediate Moment Frames
☐ Ordinary Moment Frames

Shear Wall Type

☐ Special RC Structural Wall

Boundary Element Method

☒ $c \geq l_w/600(1.55u/h_w)$
 Deflection Amplification Factor (Cd) 4.50
 Important Factor (Ie) 1.25
☐ $f_c \geq 0.2f_{ck}$

Shear for Design

Update by Code

Method
☐ MAX(Ve1,Ve2) ☒ MIN(Ve1,Ve2) ☐ Ve1 ☐ Ve2

Ve1, Vg + a1*SUM(Mn)/L, a1 = 1
 Ve2, Vg + a2*VeQ, a2 = 2

Member Types to be excluded in Seismic Design

☒ Sub-Beam ☒ Cantilever
☒ Underground Beam/Column

☐ Torsion Design
 Torsion Reduction Factor for Beam : 1

Moment Redistribution Factor for Beam : 1

OK Close

Design setting in Gen2019 v1.1

Concrete Design Code

Design Code : ACI318-14

☒ Apply Special Provisions for Seismic Design

Select Frame Type

☐ Special Moment Frames
☒ Intermediate Moment Frames
☐ Ordinary Moment Frames

☒ Consider strong column-weak beam on last floor

Shear Wall Type

☐ Special RC Structural Wall

Boundary Element Method

☒ $c \geq l_w/600(1.55u/h_w)$
 Deflection Amplification Factor (Cd) 4.50
 Important Factor (Ie) 1.25
☐ $f_c \geq 0.2f_{ck}$

Shear for Design

Update by Code

Method
☐ MAX(Ve1,Ve2) ☒ MIN(Ve1,Ve2) ☐ Ve1 ☐ Ve2

Ve1, Vg + a1*SUM(Mn)/L, a1 = 1
 Ve2, Vg + a2*VeQ (Beam), a2 = 2
 Ve2, Vg + a2*VeQ (Column), a2 = 2

☐ Beam-Column Joint Design

Member Types to be excluded in Seismic Design

☒ Sub-Beam ☒ Cantilever
☒ Underground Beam/Column

☐ Torsion Design
 Torsion Reduction Factor for Beam : 1

Moment Redistribution Factor for Beam : 1

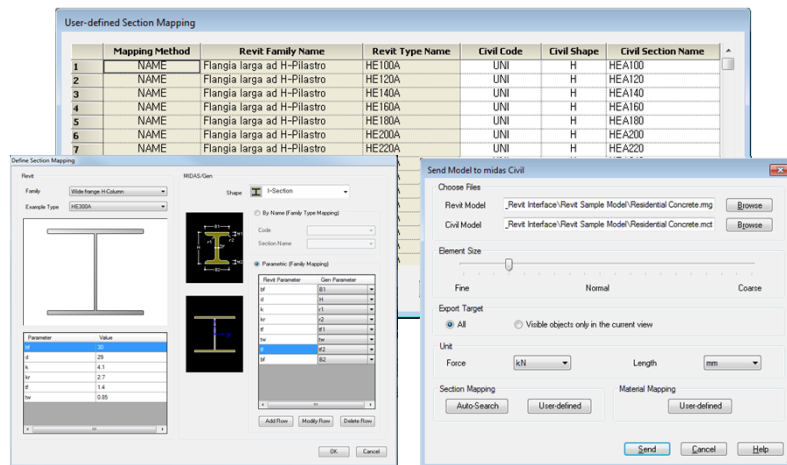
Design setting in Gen2019 v2.1

In previous versions, the checking of 'Strong Column-Weak Beam' on the roof have not been supported. From, midas Gen 2019 (v2.1), it is possible to consider the 'Strong Column-Weak Beam' on the roof.

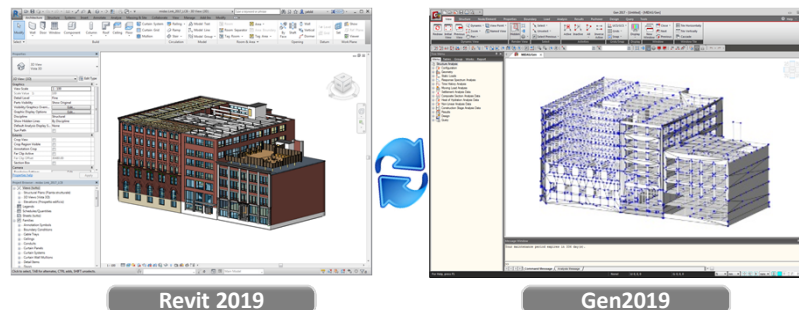
11. Revit 2019 Interface

- Using Midas Link for Revit Structure, direct data transfer between midas Gen and Revit 2019 is available for Building Information Modeling (BIM) workflow. Midas Link for Revit Structure enables us to directly transfer a Revit model data to midas Gen, and deliver it back to the Revit model file. This feature is provided as an Add-In module in Revit Structure and midas Gen text file (*.mgt) is used for the roundtrip

- File > Import > midas Gen MGT File**
- File > Export > midas Gen MGT File**



Send Model to midas Gen



	Functions	Revit <> Gen
Linear Elements	Structural Column	<>
	Beam	<>
	Brace	<>
	Curved Beam	>
	Beam System	>
	Truss	>
Planar Elements	Foundation Slab	<>
	Structural Floor	<>
	Structural Wall	<>
	Wall Opening & Window	>
	Door	>
	Vertical or Shaft Opening	>
Boundary	Offset	>
	Rigid Link	>
	Cross-Section Rotation	>
	End Release	>
	Isolated Foundation Support	>
	Point Boundary Condition	>
	Line Boundary Condition	>
	Wall Foundation	>
	Area Boundary Condition	>
	Load Nature	>
Load	Load Case	>
	Load Combination	>
	Hosted Point Load	>
	Hosted Line Load	>
	Hosted Area Load	>
	Material	<>
Other Parameters	Level	>

12. Add Material DB and Load Combination for Aluminum

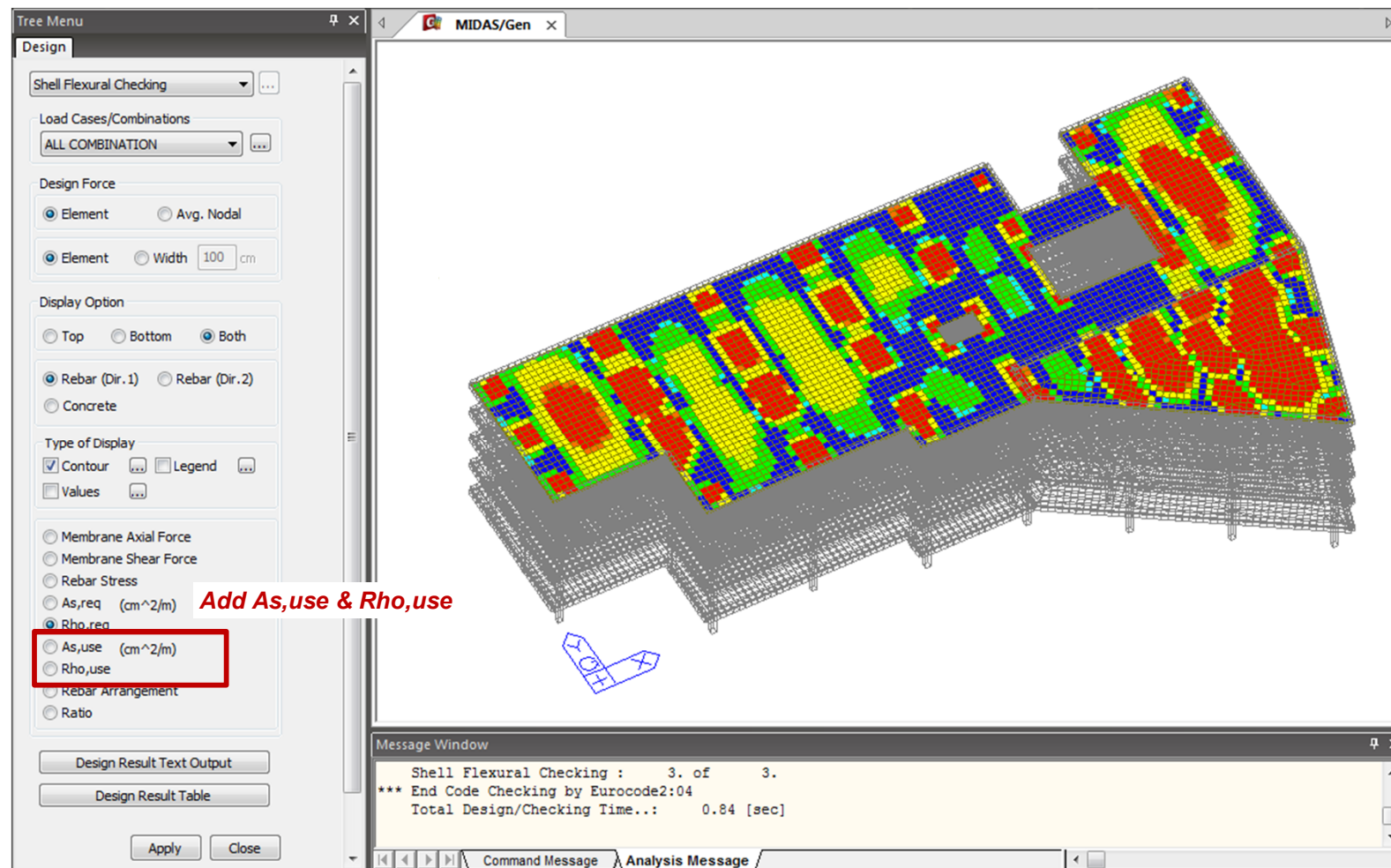
The screenshot displays three overlapping windows in the Midas Gen software interface:

- Load Combinations**: The 'General' tab is active, showing a table of load cases. A red box highlights the table, and another red box highlights the 'Aluminum Design' tab.
- Automatic Generation of Load Combinations**: The 'Option' section has 'Add' selected. Under 'Code Selection', 'Aluminum' is selected. The 'Design Code' is set to 'AA-ASD05'.
- Material Data**: The 'General' tab is active, showing material properties for 'Aluminum'. A red box highlights the 'Type of Design' dropdown, which is set to 'Aluminum'. Another red box highlights the 'Standards' dropdown, which is set to 'AA(A)'. A third red box highlights the 'Product' dropdown, which is set to 'GB50429-07(A)'.

Below the screenshots, there are two labels:

- Load Combination for Aluminum Design
- Material Data for Aluminum Design

13. Add options of As,use and Rho,use in shell flexural checking



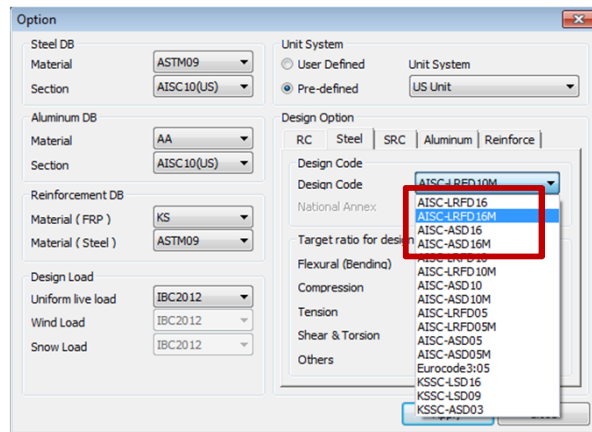
midas ***Design+***

1. Add Steel Design as per AISC360-16 and AISC360-16M

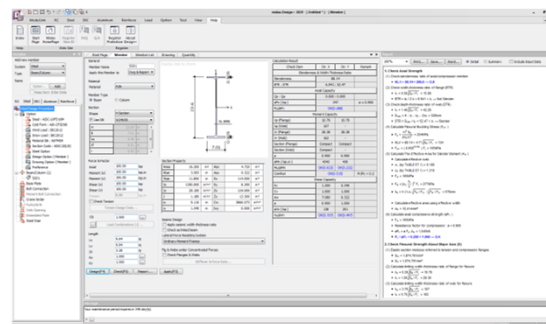
• Supported Design Items

: Steel Beam/Column, CFT Column, SRC Column, Crane Girder, Bolt Connection, Steel Stair

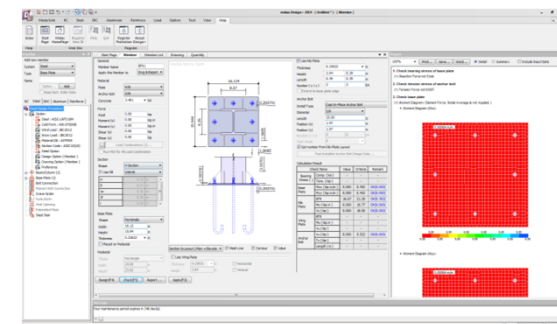
Steel Design as AISC360-16



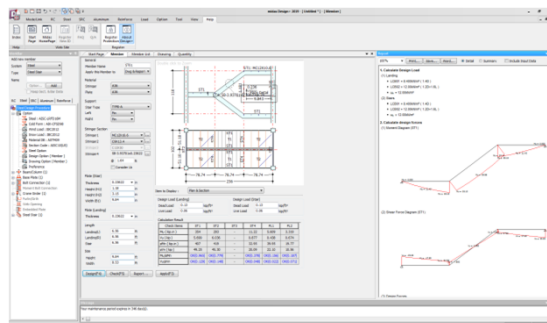
Beam / Column Design



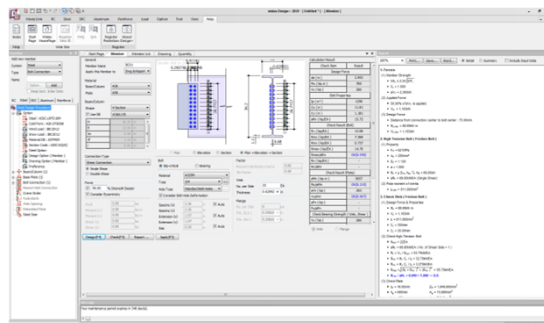
Base plate Design



Stair Design



Bolt Connection Design



Crane Girder Design

