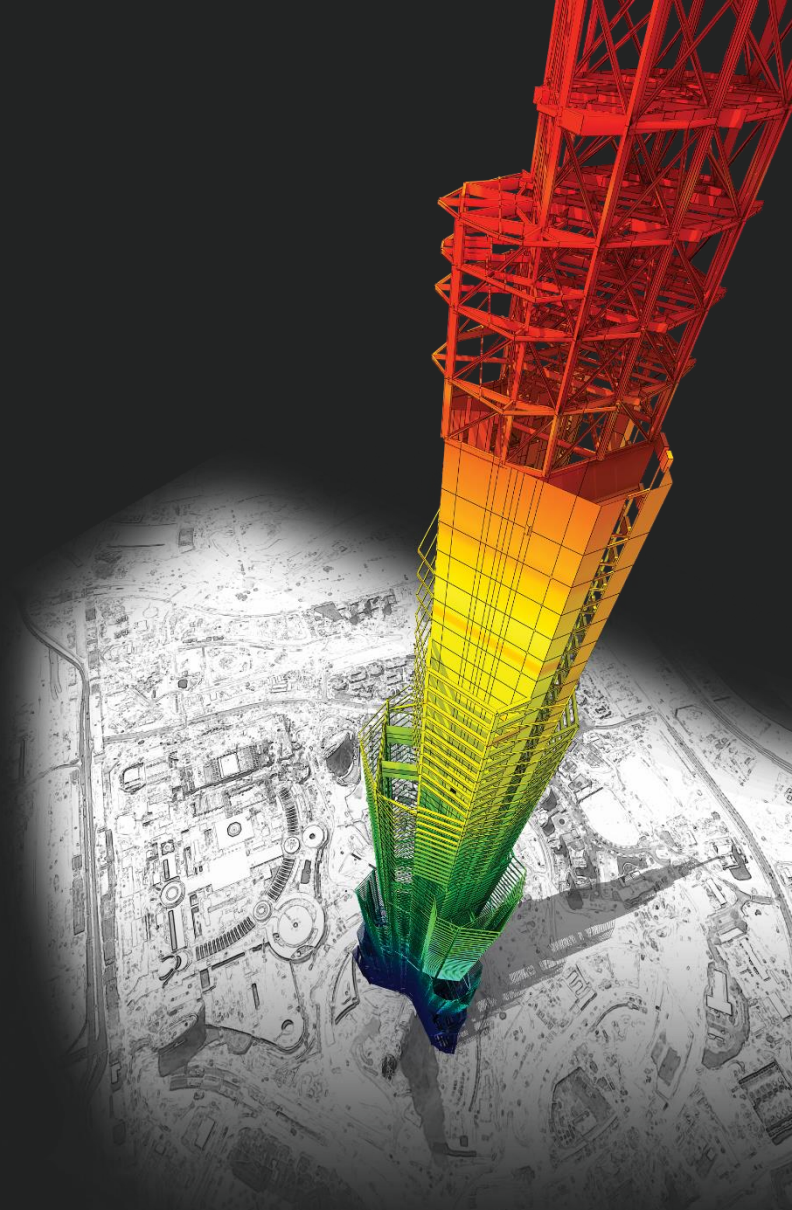


Release Note

Release Date : Mar. 2022

Product Ver. : midas Gen 2022 (v1.1) and Design+2022(v1.1)



DESIGN OF General Structures

Integrated Design System for Building and General Structures

Enhancements

- **midas Gen**

1) New American RC Code : ACI318-19 (for US.SI)	4
2) Beam-Column Joints check for Existing Building as per NTC2018	7
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11) Revit 2022 Interface	23

↓ Go to **FREE TRIAL**

↓ **INSTALLER** DOWNLOAD

midas **Gen**

1. New American RC Code : ACI318-19 (US.SI)

Added ACI318-19(US)/ACI318M-19(SI) Code for RC Design

Concrete Design Code

Concrete Design Code

Design Code : **ACI318-19** / **ACI318M-19**

Check Beam Deflection

Apply Special Provisions for Seismic Design

Seismic Design Parameter

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

Displacement Based Method

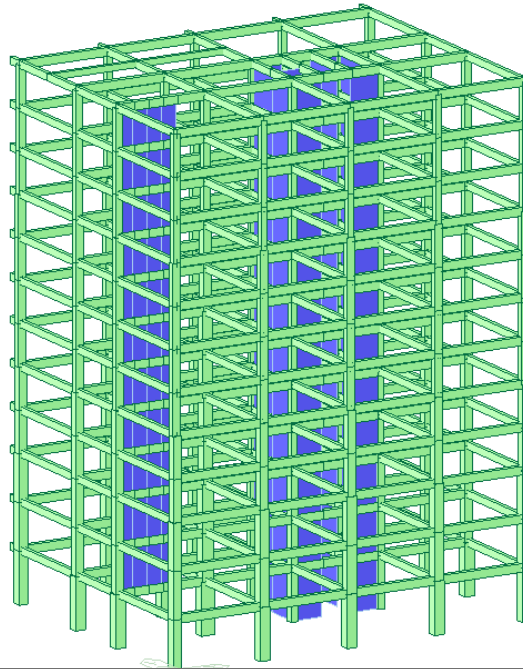
Deflection Amplification Factor (Cd) : 4.50

Important Factor (Ie) : 1.20

Stress Based Method

Shear for Design

Update by Code



Design Result Table

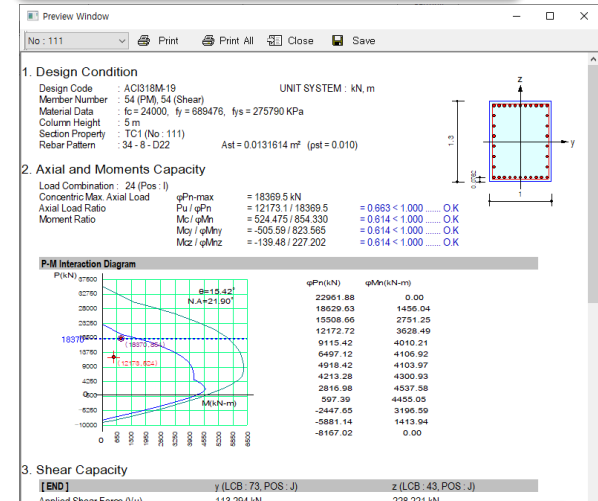
ACI318M-19 RC-Column Design Result Dialog

Code : ACI318M-19 Unit : kN , m Primary Sorting Option

Sorted by Member Property

MEMB SECT	SEL	Section		fc	fy	LCB	Pu	Mc	Ast	V-Rebar	LCB	Vu.end		Rat-V.end		As-H.end		H-Rebar.end	
		Bc	Hc									Height	fys	Rat-P	Rat-M	Vu.mid	Rat-V.mid	As-H.mid	H-Rebar.mid
0		C1		24000.0	689476	2	6783.16	134.361	0.0085	22-8-D22	59	218.357	0.306	0.0000	2-D10 @140				
104		0.800	1.000	4.0000	275790		0.626	0.538			59	218.357	0.305	0.0000	2-D10 @140				
0		C1		24000.0	689476	2	4784.04	156.064	0.0070	18-6-D22	23	219.233	0.354	0.0000	2-D10 @140				
105		0.800	0.800	4.0000	275790		0.549	0.500			23	219.233	0.352	0.0000	2-D10 @140				
0		C1		24000.0	689476	28	959.745	544.436	0.0054	14-5-D22	11	197.537	0.593	0.0008	2-D10 @180				
106		0.600	0.600	4.0000	275790		0.993	0.998			11	197.537	0.589	0.0008	2-D10 @180				
0		TC1		24000.0	689476	24	12173.1	524.475	0.0132	34-8-D22	43	228.221	0.252	0.0000	2-D10 @350				

Graphic Report



Detail Report

MEMBER NAME : 54 (PM) 54 (Shear)

1. Member Information

1) Design Code : ACI318M-19

2) Section Property : TC1 (No: 111)

3) Material : fc = 24000.000 kPa, fy = 689476.000 kPa, fys = 275790.000 kPa, Es = 201900.000 kPa, E = 199346.000 kPa

4) Length : L = 5.000m

5) Reinforcement Data

2. Axial moment capacity (End, 0.00R)

LCB : 0.020k 1.20 - 1.0 (1.13) (0.00 R)

Asid : Pu / qPn : 524.475 / 854.330 = 0.614 OK

Mz / qMz : 505.590 / 823.565 = 0.614 OK

Mx / qMx : 524.475 / 854.330 = 0.614 OK

3) Check slenderness ratio about major axis

Kc = 1.00

lc = 5.000m

lc / r = 83.017 < 133.00m

4) Compute member and moments about minor axis

Mu = -48.028kNm, Mu0 = -17.748kNm (For Dead Load)

Mu = -73.780kNm, Mu0 = -19.126kNm (For Gravity Load)

Mu = -318.048kNm, Mu0 = -328.598kNm

5) Check slenderness ratio about minor axis

Kc = 1.00

1. New American RC Code : ACI318-19 (US.SI)

Added ACI318-19 Load combinations

For Concrete Design

Automatic Generation of Load Combinations

Option
 Add Replace Add Envelope

Code Selection
 Steel Concrete SRC
 Cold Formed Steel Footing
 Aluminum

Design Code : ACI318-19

Scale Up of Response Spectrum Load Cases
 Scale Up Factor : 1 RX

Factor	Load Case
1.130	RX
1.540	RY

Wind Load Factor
 Strength-level Service-level

Consider Lateral Soil Pressure Factor
 Load Factor : 0.9

Manipulation of Construction Stage Load Case
 ST : Static Load Case
 CS : Construction Stage Load Case
 ST Only CS Only ST+CS

Consider Orthogonal Effect
 Set Load Cases for Orthogonal Effect...

100 : 30 Rule
 SRSS(Square-Root-of-Sum-of-Squares)

Generate Additional Load Combinations
 for Special Seismic Load
 for Vertical Seismic Forces
 Factors for Seismic Design...

Will Execute Construction Stage Analysis
 Consider Losses for Prestress Load Cases

Transfer Stage : 1 Define Factors
 Service Load Stage : 1

OK Cancel

Provision	Load factors and combinations	Remark
Strength Load Combinations	1.4 (D+F)	<ul style="list-style-type: none"> D : Dead Load F : Fluid Load T : Temperature Load H : Lateral pressure load of soil and water in soil L : Live load Lr : Roof live load R : Rain load W : Wind load E : Earthquake load (=Eh + Ev) Em : maximum effect of horizontal and vertical earthquake force (=Ω₀Eh) Ω₀ : Seismic force amplification factor Eh : Horizontal earthquake load Ev : Vertical earthquake load (not provided in Gen2 022 v1.1)
	1.2(D+F+T) + 1.6(L+H) + 0.5(Lr or R)	
	1.2D + 1.6(Lr or R) + (1.0L or 0.5W)	
	1.2D ± 1.0W + 1.0L + 0.5(Lr or R)	
	1.2D ± 1.0E + 1.0L	
	0.9D ± 1.0W + 1.6H	
Allowable stress Load Combinations	0.9D ± 1.0E + 1.6H	
	D + F	
	D + H + F + L + T	
	D + H + F + (Lr or R)	
	D + H + F + 0.75[L+T(Lr or R)]	
Special load combinations	D + H + F ± (0.6W or E / 1.4)	
	1.2D + 1.0L + 1.0Em	
	0.9D ± 1.0Em	

1. New American RC Code : ACI318-19 (US.SI)

Added New Rebar DB and Material as per ASTM19

Set Rebar Material

Preferences

Environment

- General
- View
- Data Tolerances
- Property
- Load
- Results
- Design/Load Code
- Notice & Help
- Graphics
- Output Formats
 - Formats - Dim. & Others
 - Formats - Forces
 - Formats - Loads

Design Code | Load Code

Steel
Design Code: AISC(15th)-LRFD14
National Annex: Recommended

Cold Formed Steel
Design Code: Eurocode3-1-3:06
National Annex: Recommended

Concrete
Design Code: ACI318-19
National Annex: Italy

Rebar
Material Code: **ASTM19(RC)**
Material DB: Grade 40

SRC
Design Code: SSRC79
Rebar
Material Code: ASTM19(RC)
Material DB: Grade 40

Save Changes Upon OK

Default All Set Default OK Cancel

Rebar strength as per ASTM 19

	Tensile Strength Fu (psi)	Yield Strength Fy (psi)
Grade 40	60,000	40,000
Grade 60	80,000	60,000
Grade 80	100,000	80,000
Grade 100	117,000	10,000

Rebar DB as per ASTM19 & Design rebar setting

Rebar Information

Rebar Code: ASTM

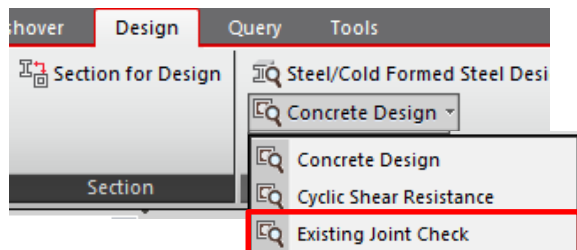
CHK	Name	Dia (in)	Area (in ²)	Dia(Out) (in)	Weight (kips/in)
<input type="checkbox"/>	#3	0.3750	0.1100	0.3750	0.0000
<input type="checkbox"/>	#4	0.5000	0.2000	0.5000	0.0001
<input type="checkbox"/>	#5	0.6250	0.3100	0.6250	0.0001
<input type="checkbox"/>	#6	0.7500	0.4400	0.7500	0.0001
<input type="checkbox"/>	#7	0.8750	0.6000	0.8750	0.0002
<input type="checkbox"/>	#8	1.0000	0.7900	1.0000	0.0002
<input type="checkbox"/>	#9	1.1280	1.0000	1.1280	0.0003
<input type="checkbox"/>	#10	1.2700	1.2700	1.2700	0.0004
<input type="checkbox"/>	#11	1.4100	1.5600	1.4100	0.0004
<input type="checkbox"/>	#14	1.6930	2.2500	1.6930	0.0006
<input type="checkbox"/>	#18	2.2570	4.0000	2.2570	0.0011

OK Close

2. Beam-Column Joints Check for Existing Building as per NTC2018

Beam-Column Joints Capacity Check for Existing Building

- Design > result > Concrete Design > Existing Joint Check



Result Table for Joint Capacity check for existing building

Elem	Position	Stress	Beam-Column Joint Check for Existing Building							
			y-axis				z-axis			
			Load	Demand (N/mm ²)	Capacity (N/mm ²)	Remark	Load	Demand (N/mm ²)	Capacity (N/mm ²)	Remark
Check Position = Bottom										
Press right mouse button and click 'Set Existing Joint Check Parameters' menu to change Load Case/Combination/Select Check Position										
81	Bottom	Tensile	sism22	8.2225	1.5000	NG	sism22	5.0651	1.5000	NG
81	Bottom	Compressive	sism22	8.2471	12.5000	OK	sism22	5.0942	12.5000	OK

Set Existing Joint Check Parameters

Set Existing Joint Check Parameters

Load Case/Combination: ALL COMBINATION

Existing Joint Check Table Type: Show Selected Elements

Select Check Position: Top Bottom

OK Cancel

Demand : Joints Stress, σ_t and σ_c

Capacity : by Equation below

– per la resistenza a trazione: **Tensile stress**

$$\sigma_{jt} = \left[\frac{N}{2A_j} - \sqrt{\left(\frac{N}{2A_j}\right)^2 + \left(\frac{V_j}{A_j}\right)^2} \right] \leq 0.3\sqrt{f_c} (f_c \text{ in MPa}) \quad [C8.7.2.11]$$

– per la resistenza a compressione: **Compressive stress**

$$\sigma_{jc} = \frac{N}{2A_j} + \sqrt{\left(\frac{N}{2A_j}\right)^2 + \left(\frac{V_j}{A_j}\right)^2} \leq 0.5f_c (f_c \text{ in MPa}) \quad [C8.7.2.12]$$

Demand ≤ Capacity → O.K
Demand > Capacity → N.G.

2. Beam-Column Joints Check for Existing Building as per NTC2018

Beam-Column Joints Check for Existing Building

- Design > result > Concrete Design > Existing Joint Check

Result Table for Beam-Column Joint check for Existing Building

Elem	Position	Stress	Beam-Column Joint Check for Existing Building							
			y-axis				z-axis			
			Load	Demand (N/mm ²)	Capacity (N/mm ²)	Remark	Load	Demand (N/mm ²)	Capacity (N/mm ²)	Remark
Check Position = Bottom										
Press right mouse button and click 'Set Existing Joint Check Parameters' menu to change Load Case/Combination/Select Check Position										
81	Bottom	Tensile	sism22	8.2225	1.5000	NG	sism22	5.0651	1.5000	NG
81	Bottom	Compressive	sism22	8.2471	12.5000	OK	sism22	5.0942	12.5000	OK

Use Tips

- This check option is activated only with NTC2018.
- If 'Apply Special Provision for Seismic Design' of concrete design code is active, this check option can't be activated.
- This check must be performed only for 'Not Confined Joint' as defined in § 7.4.4.3 of the NTC
- This check is 'existing structure review', so it is calculated using the beam reinforcement information entered by the user.

Note

C8.7.2.3.5 Beam and Column for Existing Building as per CIRCOLARE NTC2018

- [Calculation & check of diagonal tensile stress for beam-column joint]

$$\sigma_{jt} = \left[\frac{N}{2A_j} - \sqrt{\left(\frac{N}{2A_j}\right)^2 + \left(\frac{V_j}{A_j}\right)^2} \right] \leq 0.3\sqrt{f_c} (f_c \text{ in MPa}) \quad [C8.7.2.11]$$

- [Calculation & check of diagonal compressive stress for beam-column joint]

$$\sigma_{jc} = \frac{N}{2A_j} + \sqrt{\left(\frac{N}{2A_j}\right)^2 + \left(\frac{V_j}{A_j}\right)^2} \leq 0.5f_c (f_c \text{ in MPa}) \quad [C8.7.2.12]$$

Where,

1) N : Axial force acting on the upper column
(+ : compressive, - : tensile)

2) V_j : Total shear acting on the joint, obtained as a sum algebraic of the shear transmitted by the upper pillar and of the horizontal stresses transmitted by the upper parts of the beams

3) A_j : b_j * h_{jc}
where b_j and h_{jc} are defined in § 7.4.4.3.1 of the NTC

3. Crack Control Check for RC Column as per EC2:04 & NTC

RC Column Crack Width Check as per EC2:04 & NTC2018

Set Beam-Column Joint Design Parameter

Seismic Design Parameter
 Beam-Column Joint Design
 Gamma_{rd}
 Confined Joint Not Confined Joint
 Select Check Position
 Top Bottom

Check the serviceability check

RC Column Check

Code : EC2:04,NTC2018 Unit : N mm Primary Sorting Option

Sorted by Member Result Strength SECT MEMB

Serviceability
 Elastic

MEMB	SECT	SEL	Section	f _{ck}	f _{yk}	CHK	Stress Control						Crack Control								
							Lcb	sig-cl	sig-cla	Lcb	sig-cc	sig-cca	Lcb	sig-s	sig-sa	Lcb	w _y	w _z	wa _z		
913			C1	24.0000	550.000																
106			600.0 600.0	4000.0	420.000	NG#	101	11.7624	2.49610	101	15.8097	14.4000	101	113.438	440.000	97	0.0687	0.3000	80	0.3729	0.3000

Graphic Result

4. Serviceability : Stress Limit Check

	Conc.(Tens.)	Conc.(Comp.)	Conc.(Comp.)(QP)	Rebar
Load Combination	101(F)	101(F)	97(Q)	101(F)
Stress(s)	-11.76	15.81	15.64	113.44
Allowable Stress(sa)	2.50	14.40	10.80	440.00
Stress Ratio(s/sa)	Cracked Section	Cracked Section	Cracked Section	Cracked Section
Check Linear Creep			Non-linear Creep	

5. Serviceability : Crack Limit Check

When cracked section,

	y (LCB : 97, POS : J)	z (LCB : 80, POS : J)
Crack Width(w)	0.06870 mm	0.37293 mm
Allowable Crack Width(wa)	0.30000 mm	0.30000 mm
Check Ratio(w/wa)	0.229 < 1.000 O.K	1.243 > 1.000 N.G

Detail Result

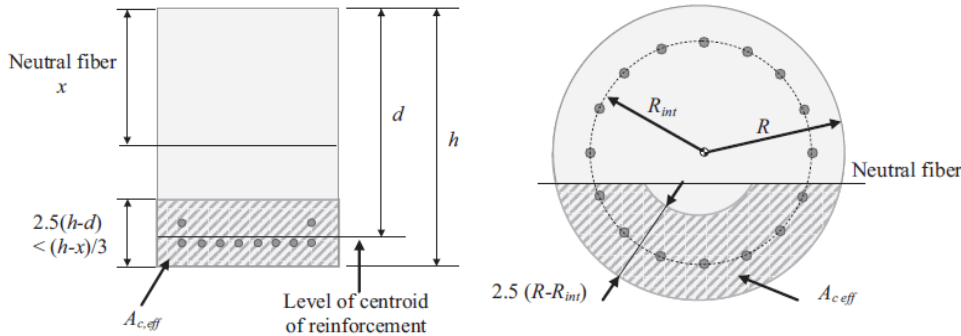
```

[[[*]]] CHECK SERVICEABILITY CRACK LIMIT ABOUT MAJOR AXIS.
=====
( ) Calculate crack width.
[ EN 1992-1-1:2004 Clause 7.3.4 , Appendix B. ]
( LCB = 97, POS = J )
- Pu = 816411.88 N.
- Muy = -191305395.40 N-mm.
- fcm = fck+8(MPa) = 32.00000 MPa.
- fctm = 0.30+fck*(2/3) = 2.49610 MPa. (fck<=C50/60)
- fct,eff = fctm (by 28 days).
- n = 12.82603
- Sigmas = 64.662 MPa.
- kt = 0.6 (for short term loading.).
- X = 329.19948 mm.
- hc,ef = MIN[ 2.5*(h-d), (h-X)/3, h/2 ] = 90.26684 mm.
- Ac,eff = Bc+hc,ef = 54160.10376 mm2.
- Rhop,eff = As/Ac,eff = 0.0214
- Ecm = 22[fcm/10]0.3+1000 = 31186.574 MPa. (by Table 3.1)
- Alphae = Es/Ecm = 6.41302
- (Epssm-Epscm) = (Sigmas-kt+fct,eff/Rhop,eff+(1+Alphae*Rhop,eff))/Es
= -0.000074
- (Epssm-Epscm) < 0.6*Sigmas/Es = 0.000194
- (Epssm-Epscm) = 0.6*Sigmas/Es = 0.000194
- Bond coefficient(k1) = 0.8000
- Strain distribution coefficient(k2) = 0.5000
- NAD Value (k3) = 3.4000
- NAD Value (k4) = 0.4250
- c = 52.40000 mm.
- Phi = 22.20000 mm.
- Sr,max = k3*c + k1*k2*k4+Phi/Rhop,eff = 354.16984 mm.
- wk = Sr,max * ( Epssm-Epscm ) = 0.06870 mm.
wk < 0.300 mm. ----> O.K !
    
```

3. Crack Control Check for RC Column as per EC2:04 & NTC

RC Column Crack Width Check as per EC2:04 & NTC2018

Calculating effective area of concrete in tension, $A_{c,eff}$, in program [Rectangular and Circular Column]



✓ Note

Calculate crack width using the following formula as per EC2:04 and NTC

$$Wk = S_{r,max} (\epsilon_{sm} - \epsilon_{cm}) \leq Wk_{,max}$$

1. Determine $\epsilon_{sm} - \epsilon_{cm}$

$$\epsilon_{sm} - \epsilon_{cm} = \frac{\sigma_s - k_t \frac{f_{ct,eff}}{\rho_{p,eff}} (1 + \alpha_e \rho_{p,eff})}{E_s} \geq 0.6 \frac{\sigma_s}{E_s}$$

2. Determine $S_{r,max}$

$$S_{r,max} = k_3 c + \frac{k_1 k_2 k_4 \phi}{\rho_{p,eff}}$$

✓ Information

- 1) The stress check with cracked section is obtained along each axis in the program. Similarly, crack check is performed along local axis (y & z axis)
- 2) In GSD, you can also check actual stress in the cracked section on bi-axis along with stress in each reinforcement bar.
- 3) For calculating effective area of concrete in tension for circular cross sections ($A_{c,eff}$), the program use the equation by Wiese et al (left side)

- For determining $\epsilon_{sm} - \epsilon_{cm}$

- 1) ϵ_{sm} : The mean strain in the reinforcement under the relevant combination of loads, including the effect of imposed deformations and taking into account the effects of tensile stiffening.
- 2) ϵ_{cm} : The mean strain in the concrete between cracks.
- 3) σ_s : The stress in the tension reinforcement
- 4) α_e : E_s / E_{cm} .
- 5) k_t : factor dependent on duration of the load.
0.6 for short-term load, 0.4 for long-term load
- 6) $\rho_{p,eff}$: $A_s / A_{c,eff}$

- For determining $S_{r,max}$

- 1) ϕ : bar diameter. The program uses the ϕ of the outer layer.
- 2) c : cover to the longitudinal reinforcement.
- 3) k_1 : A coefficient accounting the bond properties of rebar (0.8 for high bond bars)
- 4) k_2 : Coefficient accounting for distribution of strain. (0.5 for bending)
- 5) k_3 : 3.4 (recommended values)
- 6) k_4 : 0.425(recommended values)

4. SCWB Design/Checking Method Option as per ACI Series

Added nominal strength method for design force calculation, special provision for seismic design

- Design > RC Design > Design Code > SCWB Design/Checking Method

SCWB Design/Checking Option

SCWB Design/Checking Method

Design Strength
 Nominal Strength

Use Tips

- The applied codes are ACI318-19,14(including M), NSR-10, NSCP2015
- This option can be activated when
 - ACI 318-19,14 , NSCP-2015: Special Moment Frames in Seismic Design Parameter
 - NSR-10 : DES(Special Energy Dissipation) or DMO (Moderate Energy Dissipation) Class in Seismic Design Parameter

Note

1. Column design moment as per selection Performing Ductile Design & Checking

[Design Strength Method] Using the Design strength of beams, $\phi_b M_n$

$$M_{c,B} = \left(\frac{6}{5}\right) (\phi_b M_{nb,L} + \phi_b M_{nb,R}) \left(\frac{M_{ce,B}}{M_{ce,T} + M_{ce,B}}\right)$$

$$M_{c,T} = \left(\frac{6}{5}\right) (\phi_b M_{nb,L} + \phi_b M_{nb,R}) \left(\frac{M_{ce,T}}{M_{ce,T} + M_{ce,B}}\right)$$

[Nominal Strength Method] Using the nominal strength of beams, M_n

$$M_{c,B} = \left(\frac{6}{5}\right) (M_{nb,L} + M_{nb,R}) \left(\frac{M_{ce,B}}{M_{ce,T} + M_{ce,B}}\right)$$

$$M_{c,T} = \left(\frac{6}{5}\right) (M_{nb,L} + M_{nb,R}) \left(\frac{M_{ce,T}}{M_{ce,T} + M_{ce,B}}\right)$$

2. SCWB Ratio Calculation as per selection Performing SCWB Design & Checking

[Design Strength Method] Using the Design strength of beams and Column, $\phi_b M_{nb}$, $\phi_c M_{nc}$

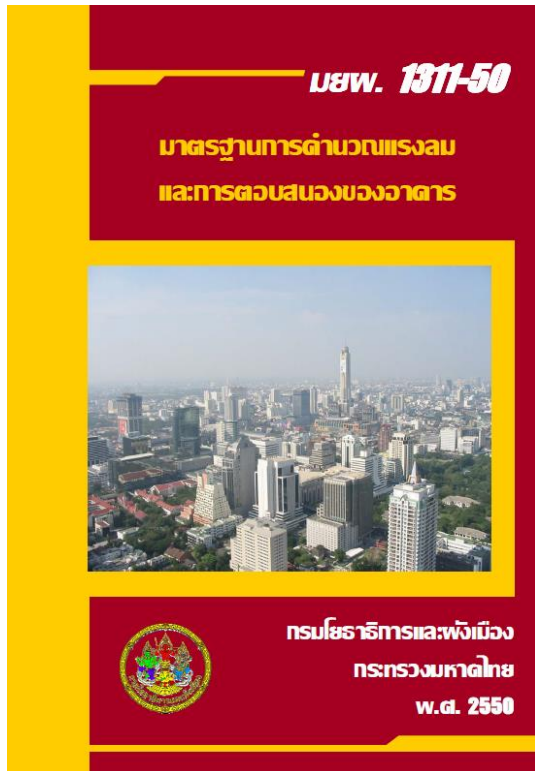
$$\text{Ratio} = \left(\frac{\phi_c M_{nc,T} + \phi_c M_{nc,B}}{\phi_b M_{nb,L} + \phi_b M_{nb,R}}\right)$$

[Nominal Strength Method] Using the nominal strength of beams & Column, M_{nb} , M_{nc}

$$\text{Ratio} = \left(\frac{M_{nc,T} + M_{nc,B}}{M_{nb,L} + M_{nb,R}}\right)$$

5. Thailand Code : DPT (Wind and Seismic load)

Added DPT.1311-50:2007(Wind Load)



Wind Load

Add/Modify Wind Load Specification

Load Case Name : WX
 Wind Load Code : DPT.1311-50:2007
 Description :

Wind Load Parameters
 Application Method
 Simplified Method General Method

Common Parameters
 Wind Zone : Zone 1
 Basic Wind Speed : 25 m/sec
 Terrain Category : C
 Importance Factor : 1.00

Topographic Effects
 Include Topographic Effects

Hill Shape : 2D Ridge or Valley
 Building Location : Upwind
 Hill Height : 0 m
 Hill Length : 0 m
 Crest-Building Distance : 0 m

Gust Factors and Pressure Coefficient
 Auto Calculate by Structure Information...
 Major : 2.5 Ortho. : 2.5

Additional Parameters
 Across Wind
 Torsional Wind
 Wind Response (Disp. / Accel.)

Parameters of Wind Vibration...

Wind Load Direction Factor (Scale Factor)
 X-Dir, 1 Y-Dir, 0 Z-Rot, 0

Additional Wind Loads (Unit:N,mm)

Story	Along Add-X	Along Add-Y	Across Add-X

Wind Load Profile... OK Cancel Apply

Wind load Calc. Sheet per DPT1311-05(2007)

WIND LOADS BASED ON DPT.1311-50:2007 / DETAILED METHOD 3 (UNIT: N, mm)

- BASIC INPUT DATA : DPT.1311-50:2007
 Design Code : DPT.1311-50:2007
 Calculation Method : Detailed Method
 Wind Zone : 1
 Average Roof Height : 50000.00
 Basic Wind Speed, V50 : 25.00
 Exposure Category : B
 Importance Factor, Iw : 1.00
 Fundamental Natural Frequency (Hz) : Major = 0.00, Ortho. = 0.00
 Damping Ratio : Major = 0.0000, Ortho. = 0.0000
- GUST FACTOR : 2.50
 Cg (Major) : 2.50
 Cg (Ortho.) : 2.50
- TOPOGRAPHIC EFFECT : Not Considered
- EQUATION FOR WIND LOADS : F = p A
 Wind Force : p = Iw q Cc Cg Cp
 Design Wind Pressure : q = 1/2 rho (V50 TF)^2
- SCALE FACTOR FOR WIND LOADS : SFx = 1.00
 X-directional Wind Loads : SFy = 0.00
 Y-directional Wind Loads

Wind load profile per DPT1311-05(2007)

Wind Direction : Along Across Torsional

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

Select Profile : Story Force Story Shear Overturning Moment

Story Name	Elev.	Loaded H	Loaded B	Wind Forc
Roof	50000.0	2000.0	29100.0	37639.851
12F	46000.0	4000.0	29100.0	72217.981
11F	42000.0	4000.0	29100.0	69080.688
10F	38000.0	4000.0	29100.0	65858.459
9F	34000.0	4000.0	29100.0	62539.64
8F	30000.0	4000.0	29100.0	59109.375
7F	26000.0	4000.0	29100.0	59109.375
6F	22000.0	4000.0	29100.0	59109.375
5F	18000.0	4000.0	29100.0	59109.375


File Name : D:\W00_2021년\WGen2022_상반기 검증\WColumn crack\W
 Make Wind Load Calc. Sheet Browse

Close

5. Thailand Code : DPT (Wind and Seismic load)

Added DPT.1301/1302-61:2018 (Seismic Load)

UHW.1301/1302-61
มาตรฐานการออกแบบอาคารต้านทาน
การสั่นสะเทือนของแผ่นดินไหว



กรมวิชาการฯ พังเมือง
กระทรวงมหาดไทย
พ.ด. 2561

Static seismic Load

Add/Modify Seismic Load Specification

Load Case Name : EX

Seismic Load Code : DPT.1301/1302-61:2

Description :

Seismic Load Parameters

Region
 Bangkok Region except Bangkok

Method
 By Graph 1.4.6~7 By Table 1.4-4~5

Seismic Zone
 Seismic Zone 2

Design Spectral Acceleration
 Site Class Sd by Code

Ss 0.75 Fa 1.2 Sds 0.6 g
 S1 0.30 Fv 1.8 Sd1 0.36 g
 Period Coef. (Cu) 1.5

Category
 Risk Category II
 Importance 1.00

Seismic Design Category
 Sds

Response Spectrum

Generate Design Spectrum

Design Spectrum : DPT.1301/1302-61:2018

Region
 Bangkok Region except Bangkok

Method
 By Graph 1.4.6~7 By Table 1.4-4~5

Seismic Zone
 Seismic Zone 2

Design Spectral Acceleration
 Site Class Sd by Code

Ss 0.75 S1 0.30
 Fa 1.2 Sds 0.6 g
 Fv

Auto-Draw Response Spectrum Functions per DPT1301/1302-61(2018))

Define Factors per DPT1301/1302-61(2018)

Structural Parameters

Analytical Pe
 Approximate Fundamental Pe

Response Mod.
 Damping Ratio

Seismic Load D
 X-Direction : 1

Accidental Eco
 X-Direction (Ex
 Y-Direction (Ex

Torsional Amplification

Period Calculator

Major Direction
 1. T = 0.02 H (for RC)
 2. T = 0.03 H (for Steel)
 3. T = N + H (User Input)

H 50 m
 N 0.025
 Calculate

Ortho. Direction
 1. T = 0.02 H (for RC)
 2. T = 0.03 H (for Steel)
 3. T = N + H (User Input)

H 50 m
 N 0.025
 Calculate

Period 1 sec

OK Cancel

Add/Modify/Show Response Spectrum Functions

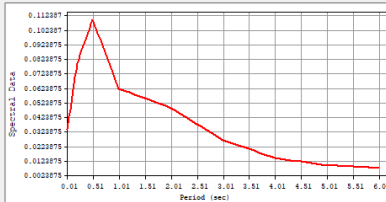
Function Name
 DPT.1301/1302-61:2018

Spectral Data Type
 Normalized Accel. Acceleration Velocity Displacement

Scaling
 Scale Factor 1 Maximum Value 0 g

Gravity 9806 mm/sec²
 Damping Ratio 0.05

Period (sec)	Spectral Data (g)
1	0.0100
2	0.0290
3	0.0480
4	0.0670
5	0.0860
6	0.1050
7	0.1240
8	0.1430
9	0.1620
10	0.1810
11	0.2000
12	0.2300
13	0.2600
14	0.2900



Description DPT.1301/1302-61:2018 : Bangkok,Zone=3,I=1.0,R=4.0

OK Cancel Apply

6. Addition of Thailand DB(TIS for SI,MKS)

Added Concrete/Rebar DB and material as per TIS (for SI,MKS Unit system)

Set Rebar Material

Concrete strength as per TIS

Rebar DB as per TIS & Design rebar setting

Rebar Information

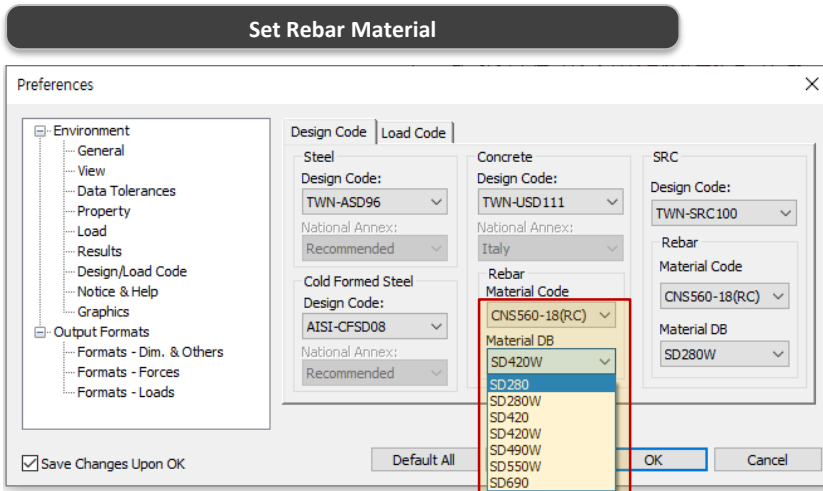
CHK	Name	Dia (mm)	Area (mm ²)	Dia(Out) (mm)	Weight (tonf/mm)
<input type="checkbox"/>	DB6	6.0000	22.2000	6.0000	0.0000
<input type="checkbox"/>	DB8	8.0000	39.5000	8.0000	0.0000
<input type="checkbox"/>	DB10	10.0000	61.6000	10.0000	0.0000
<input type="checkbox"/>	DB12	12.0000	88.8000	12.0000	0.0000
<input type="checkbox"/>	DB16	16.0000	157.8000	16.0000	0.0000
<input checked="" type="checkbox"/>	DB20	20.0000	246.6000	20.0000	0.0000
<input type="checkbox"/>	DB22	22.0000	298.4000	22.0000	0.0000
<input type="checkbox"/>	DB25	25.0000	385.3000	25.0000	0.0000
<input type="checkbox"/>	DB28	28.0000	483.4000	28.0000	0.0000
<input type="checkbox"/>	DB32	32.0000	631.3000	32.0000	0.0000
<input type="checkbox"/>	DB36	36.0000	799.0000	36.0000	0.0000
<input type="checkbox"/>	DB40	40.0000	986.5000	40.0000	0.0000
<input type="checkbox"/>	RB6	6.0000	22.2000	6.0000	0.0000
<input type="checkbox"/>	RB8	8.0000	39.5000	8.0000	0.0000
<input type="checkbox"/>	RB9	9.0000	49.9000	9.0000	0.0000
<input type="checkbox"/>	RB10	10.0000	61.6000	10.0000	0.0000

Rebar strength as per TIS

	Tensile Strength Fu (MPa)	Yield Strength Fy (MPa)	Yield Strength Fy (KSC)
SR 24	385	235	2400
SD 30	480	295	3000
SD 40	560	390	4000
SD 50	620	490	5000

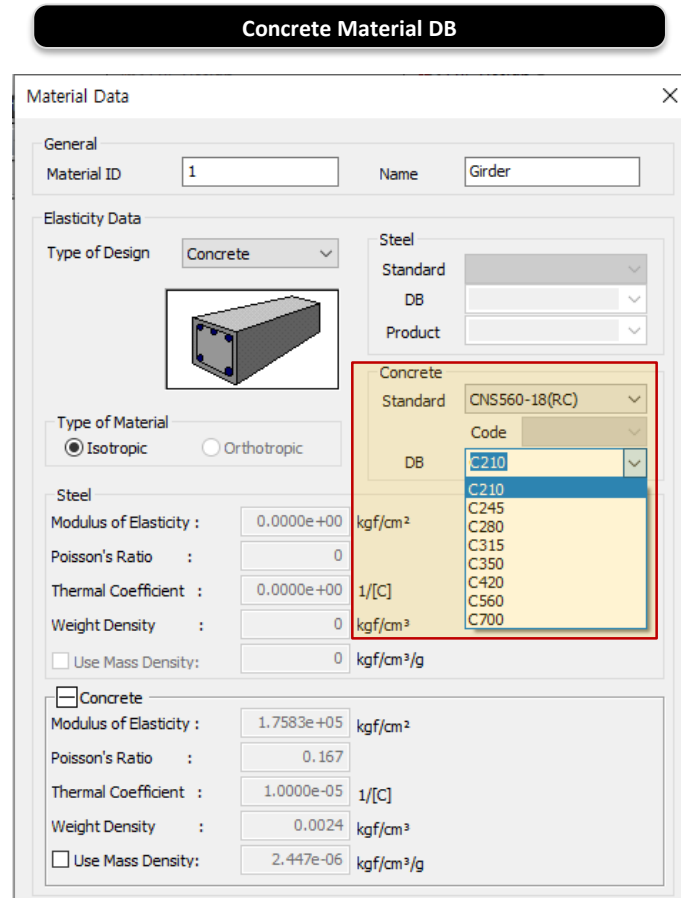
7. Addition of Taiwan DB(CNS560-18)

Added New Concrete/Rebar DB and Material as per CNS560-18



Rebar strength as per CNS560-18

	Yield Strength Fy (kgf/cm ²)
SD280	2,800
SD280W	2,800
SD420	4,200
SD420W	4,200
SD490W	5,000
SD550W	5,600
SD690	7,000



8. Addition of Indonesia DB(SNI)

Added Concrete/Rebar DB and material as per SNI

Set Rebar Material

Concrete strength as per SNI

Rebar DB as per SNI & Design rebar setting

Rebar Information

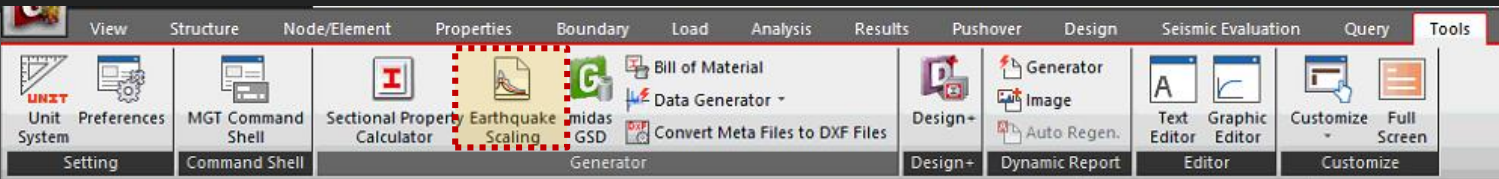
Rebar Code: SNI

CHK	Name	Dia (mm)	Area (mm ²)	Dia(Out) (mm)	Weight (N/mm)
<input type="checkbox"/>	D6	6.0000	28.2740	6.0000	0.0022
<input type="checkbox"/>	D8	8.0000	50.2660	8.0000	0.0039
<input type="checkbox"/>	D10	10.0000	78.5400	10.0000	0.0061
<input type="checkbox"/>	D13	13.0000	132.7330	13.0000	0.0102
<input type="checkbox"/>	D16	16.0000	201.0620	16.0000	0.0155
<input type="checkbox"/>	D19	19.0000	283.5290	19.0000	0.0218
<input checked="" type="checkbox"/>	D22	22.0000	380.1340	22.0000	0.0293
<input checked="" type="checkbox"/>	D25	25.0000	490.8750	25.0000	0.0378
<input type="checkbox"/>	D29	29.0000	660.5210	29.0000	0.0508
<input type="checkbox"/>	D32	32.0000	804.2500	32.0000	0.0619
<input type="checkbox"/>	D36	36.0000	1017.8780	36.0000	0.0784
<input type="checkbox"/>	D40	40.0000	1256.6400	40.0000	0.0967
<input type="checkbox"/>	D50	50.0000	1963.5000	50.0000	0.1511
<input type="checkbox"/>	D54	54.0000	2290.2260	54.0000	0.1763
<input type="checkbox"/>	D57	57.0000	2551.7650	57.0000	0.1964

Rebar strength as per SNI

Grade	Tensile Strength Fu (MPa)	Yield Strength Fy (MPa)
BjTP 280	350	280
BjTS 280	350	280
BjTS 420A	525	420
BjTS 420B	525	420
BjTS 520	650	520
BjTS 550	687.5	550
BjTS 700	805	700

9. Earthquake Scaling Calculator



Input Seismic wave and target spectrum

Earthquake Scaling Calculator

Input Data

Earthquake

Define Earthquake Functions

	Earthquake 1	Earthquake 2
1	Earthquake-1(X)	Earthquake-1(Y)
2	Earthquake-2(X)	Earthquake-2(Y)
3	Earthquake-3(X)	Earthquake-3(Y)
4		

Damping Ratio : 0.05

Target Spectrum

Define Design Spectrum

Apply the Same Amplification Factor 1.17

	Period (Sec)	Amplification factor
1	0.0000 ~ 0.0866	1.0000
2	0.0866 ~ 0.4329	1.0000
3	0.4329 ~ 6.0000	1.0000
4		

Target Period

	Period (Sec)
1	0.3000 ~ 2.2500
2	

Earthquake Scaling Control

Method: Amplitude Frequency

Scale Factor: Auto User 1.1383

Calculate

Result Graph

Graph Type: Spectrum Acceleration

Earthquake Name: All

Check Scaling Results and Export Results

Setting of Scaling method and scale factor

Check Scaling Results and Export Results

-Function : Scaling so that the average of the SRSS spectrum of the input seismic wave is greater than or equal to the target spectrum for the target period

9. Earthquake Scaling Calculator

-Tools > Generator > Earthquake Scaling

1 Input Data

Earthquake

Define Earthquake Functions

	Earthquake 1	Earthquake 2
1	Earthquake-1(X)	Earthquake-1(Y)
2	Earthquake-2(X)	Earthquake-2(Y)
3	Earthquake-3(X)	Earthquake-3(Y)
4		

Damping Ratio : 0,05

2 Target Spectrum

Define Design Spectrum

Apply the Same Amplification Factor 1,17

	Period (Sec)	Amplification factor
1	0.0000 ~ 0.0866	1.0000
2	0.0866 ~ 0.4329	1.0000
3	0.4329 ~ 6.0000	1.0000
4		

3 Target Period

	Period (Sec)
1	0.3000 ~ 2.2500
2	

4 Import Input Data Export Input Data

Add/Modify/Show Earthquake Functions

Function Name: Earthquake-1(X)

Time Function Data Type: Gravity

Normalized Acceleration: 9,806 m/sec²

Time (sec)	Function (g)
1	0.0200 0.0010
2	0.0400 0.0008
3	0.0600 0.0006
4	0.0800 0.0005
5	0.1000 0.0003
6	0.1200 0.0009
7	0.1400 0.0015
8	0.1600 0.0014
9	0.1800 0.0009
10	0.2000 0.0004
11	0.2200 -0.0001
12	0.2400 0.0010
13	0.2600 0.0020
14	0.2800 0.0029

Generate Design Spectrum

Design Spectrum : KDS(41-17-00:2019)

Design Spectral Response Acceleration

Seismic Zone: 1

EPA(S): 0,22

Site Class: S2

Fa: 1,38000 Sds: 0,50600 g

Fv: 1,38000 Sd1: 0,20240 g

Importance Factor (Ie): 1,2

Response Modification Coef. (R): 4

Max. Period : 6 (Sec)

1 Enter seismic wave information considering the conditions of the ground where the structure is located. Import seismic waves saved as SGS files or copy and paste input data into Excel format.

2 Set the design response spectrum according to the standard and input the magnification of the target spectrum.

3 Set the scaling target period.

4 Import and export input data as wzd files.

9. Earthquake Scaling Calculator

-Tools > Generator > Earthquake Scaling

5 Earthquake Scaling Control

Method: Amplitude Frequency

Scale Factor: Auto User

Calculate

6 Result Graph

Graph Type: Spectrum Acceleration

Earthquake Name: All

7 Export Results to T.H Funcs. Export Results to SGS files Export Results to Excel

Close

- 5** Set the method and scale factor of earthquake scaling control.
- 6** Check the scaling results in spectrum and acceleration graphs.
- 7** The scaled seismic wave results can be exported as SGS files or time history functions or saved as Excel files.

Example of T.H function export

Time History Analysis

Time Forcing Functions : 6

- Function 1 [Earthquake-1(X)_1.1]
- Function 2 [Earthquake-1(Y)_1.1]
- Function 3 [Earthquake-2(X)_1.1]
- Function 4 [Earthquake-2(Y)_1.1]
- Function 5 [Earthquake-3(X)_1.1]
- Function 6 [Earthquake-3(Y)_1.1]

Add/Modify/Show Time History Functions

Function Name: Earthquake-1(X)_1.1

Time Function Data Type: Normalized Accel. Acceleration Force Moment Normal

Scale Factor: Gravity: 9.806 m/sec²

Scale Factor Maximum Value 0 g

Graph Options: X-axis log scale Y-axis log scale F.F.T

Import	Earthquake	Heel Drop
1	0.0200	0.0012
2	0.0400	0.0010
3	0.0600	0.0007
4	0.0800	0.0005
5	0.1000	0.0004
6	0.1200	0.0010
7	0.1400	0.0017
8	0.1600	0.0016
9	0.1800	0.0011
10	0.2000	0.0005
11	0.2200	-0.0001
12	0.2400	0.0011
13	0.2600	0.0023
14	0.2800	0.0033

Example of excel export

[1] Earthquake-1(X), Earthquake-1(Y) (Amplitude)

Spectrum

Period (sec)	Earthquake ke-100	Earthquake ke-100	SRSS	Scale Factor
0.00	0.081256	0.073131	0.109319	-
0.02	0.081145	0.072996	0.109146	-
0.04	0.081088	0.072938	0.109065	-
0.06	0.135739	0.084773	0.160036	-
0.08	0.127343	0.089142	0.155443	-

Acceleration (Earthquake-1(X))

Time (sec)	Earthquake e-100
0.02	0.001177
0.04	0.000959
0.06	0.000738
0.08	0.000518
0.10	0.000383

10. Preview function of Start Page

- Personalized welcome message
- A section to see most recently used models
- Link to our technical knowledge site

Welcome to MIDAS

[MIDAS Blog]

Fundamentals of Seismic Isolation Analysis

Go to MIDAS Customer Online Support [Knowledge Base]

You can download the newest version of products. [Tickets]

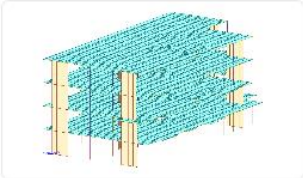
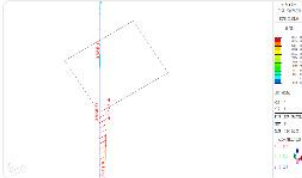
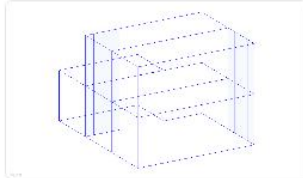
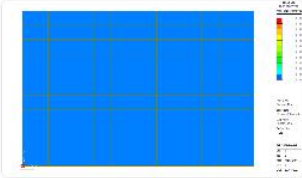
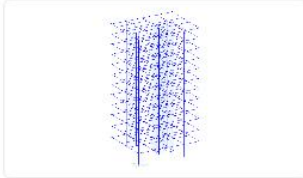
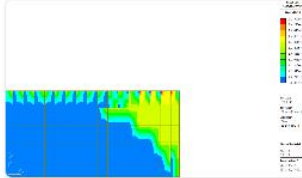
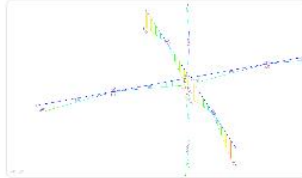
We can help you find solutions and answers.

[MIDAS Webinar]

RC Shell Design as per EC2

Dec 13th 2021 - Dec 28th 2021

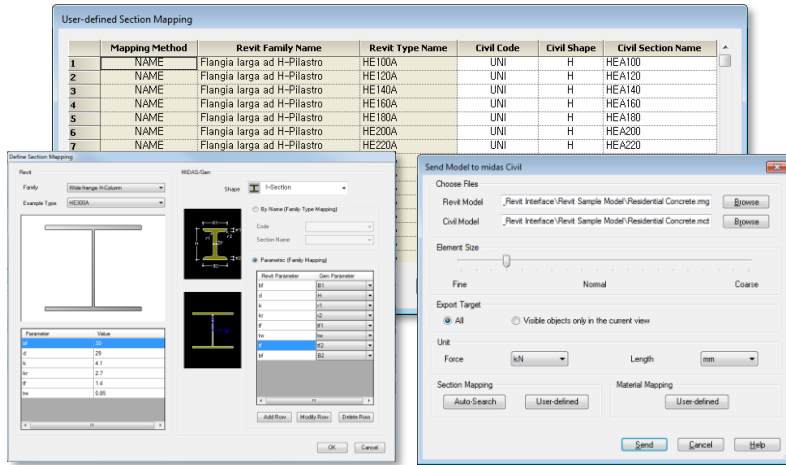
Recent ☰ ☱

+			
New Project	CEV+003 Attivi solo SLVXY-211 209-GBA 2021-12-13 09:41:12	Def_design4 - EC08 2021-12-10 18:18:47	Non-dis_COLUMN 2021-12-09 12:29:41
			
slab(ACI318-14) 2021-12-08 19:15:34	RC(ACI318-14) 2021-12-08 16:33:16	Query 2021-12-08 09:21:04	210929_Edificio Ensemble3 2021-12-08 10:54:08

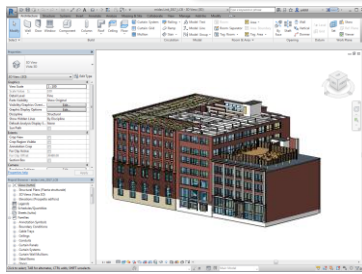
11. Revit 2022 Interface

Gen-Revit Link

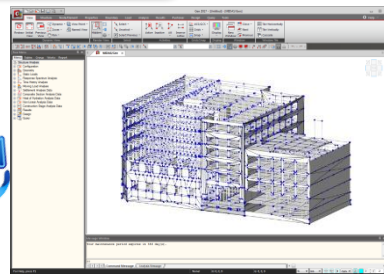
- **File > Import > midas Gen MGT File**
- **File > Export > midas Gen MGT File**



Send Model to midas Gen



Revit 2022



Gen2022 v1.1 (New version)

	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	>	
	Offset	>	
Boundary	Rigid Link	>	
	Cross-Section Rotation	>	
	End Release	>	
	Isolated Foundation Support	>	
	Point Boundary Condition	>	
	Line Boundary Condition	>	
	Wall Foundation	>	
	Area Boundary Condition	>	
	Load	Load Nature	>
		Load Case	>
Load Combination		>	
Hosted Point Load		>	
Hosted Line Load		>	
Other Parameters	Hosted Area Load	>	
	Material	<>	
	Level	>	