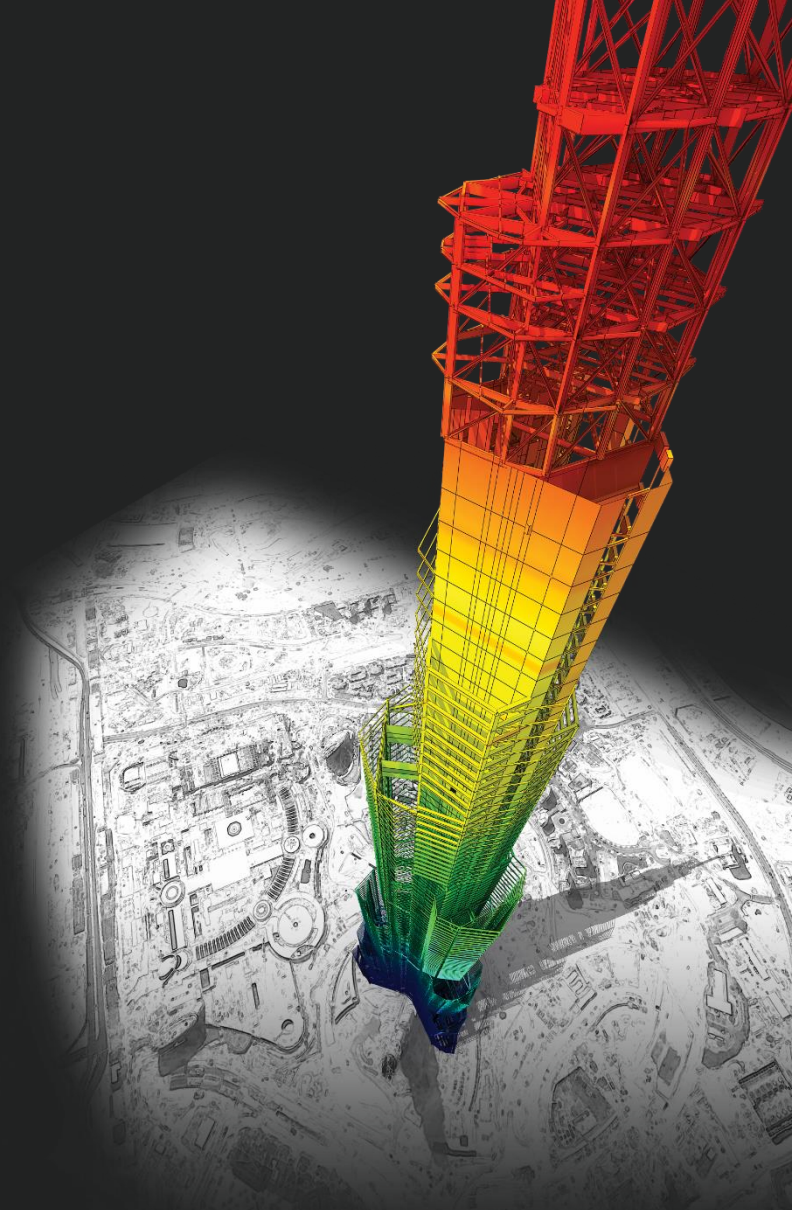


Release Note

Release Date : August. 2019

Product Ver. : midas Gen 2020 (v1.1) and Design+ 2020 (v1.1)



DESIGN OF General Structures

Integrated Design System for Building and General Structures

Enhancements

- *midas Gen*

- 1) 側推非線性鉸可考慮軸力變化 4
- 2) 在版牆設計結果中新增“Update Rebar Option”功能 5
- 3) 優化RC柱設計結果報表 6
- 4) 新增厚度資料名稱欄位 7
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- 6) 新增顯示板元素分析結果之中心點數據 9
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- 8) 新增NTC 2018規範之Non-Dissipative Element設計功能 11
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- *midas Design+*

- 1) 新增AISC規範之螺栓彎矩接合設計檢核功能 20

midas **Gen**

1. 側推非線性鉸可考慮軸力變化

- 可依照斷面的P-M互制關係，定義各軸力下P-M值對應的非線性鉸參數

▪ Pushover > Properties > Define Pushover Hinge Properties

FEMA Multi-Curve

Directional Properties of Pushover Hinge : GSD Import Type

Multiple inputs depending on a selected axial force

Properties of I-end		Properties of J-end	
<input checked="" type="checkbox"/> Multi-Curve	<input type="checkbox"/> Define Axial Force		
Axial Force (P)	0,000 kN		

User Defined	
M/MY	D/DY
-E -0,2	-E -15
-D -0,2	-D -10,5
-C -1	-C -10
-B -1	-B -1
A 0	A 0
B 1	B 1
C 1	C 10
D 0,2	D 10,5
E 0,2	E 15

Yield Strength (MY)	
(+)	(-)
0,001	0,001

Yield Curvature (DY)	
(+)	(-)
0	0

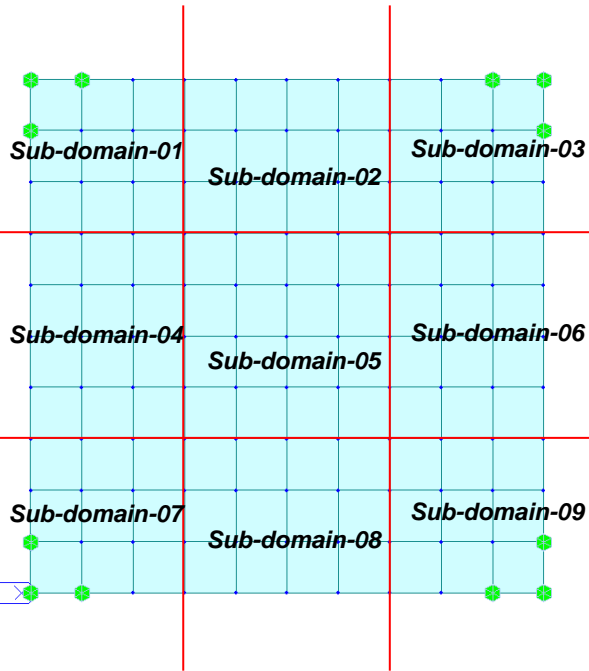
Auto-Definition depending on a selected force

2. 在版牆設計結果中新增 “Update Rebar Option” 功能

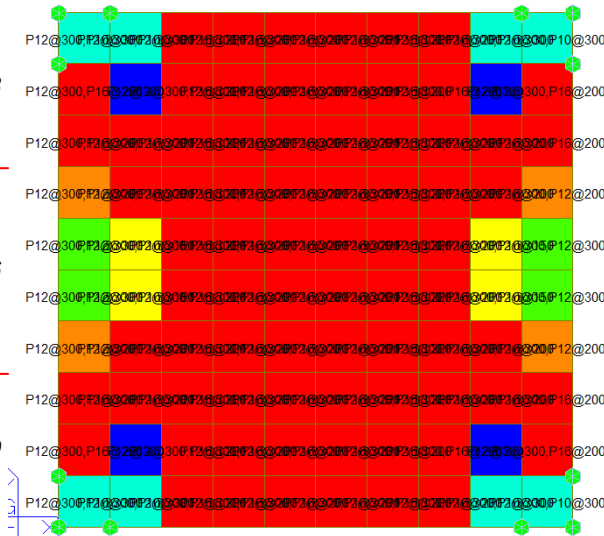
- 可選擇依Element或依Sub-Domain的設計結果來進行Update Rebar

Added methods to input rebar information

Define Sub-domain



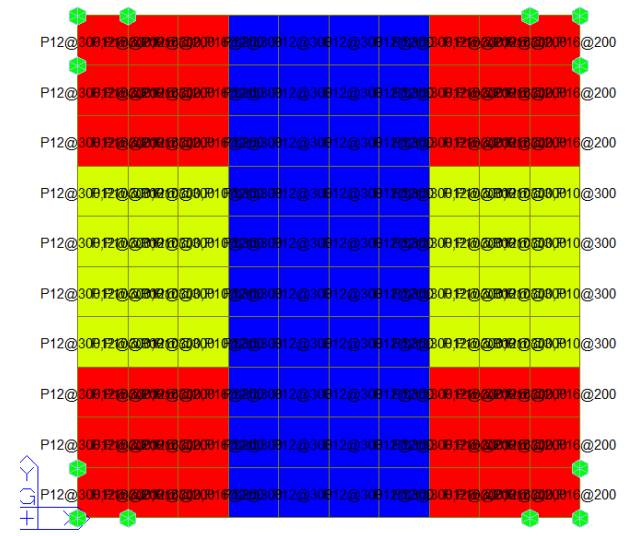
Update rebar by elements



Update Rebar Option

- Element Sub-Domain

Update rebar by Sub-domains (New)



Update Rebar Option

- Element Sub-Domain

3. 優化RC柱設計結果報表

Printout shear design result for each direction in graphic report (RC column)

Midas Gen 2019 v2.2

5. Shear Force Capacity Check (End)

Applied Shear Force
Design Shear Strength
Shear Ratio
Joint Shear Ratio

Vu = 198.243 kN (Load Combination : 16)
 $\phi V_c + \phi V_s = 276.331 + 842.734 = 1119.06$ kN (As-H_{req} = 0.00053 m²/m, 2-P10 @30)
 Vu/ $\phi V_n = 0.177 < 1.000$ O.K
 V_{hj}/ $\phi V_{nj} = 0.00000 / 0.00000 = 0.000 < 1.000$ O.K

6. Shear Force Capacity Check (Middle)

Applied Shear Force
Design Shear Strength
Shear Ratio

Vu = 198.243 kN (Load Combination : 16)
 $\phi V_c + \phi V_s = 277.275 + 210.684 = 487.959$ kN (As-H_{req} = 0.00053 m²/m, 2-P10 @120)
 Vu/ $\phi V_n = 0.406 < 1.000$ O.K

Midas Gen 2020 v1.1

3. Design for Shear

[END]

Applied Shear Force (V_{Ed})
Shear Ratio (V_{Ed}/V_{Rdc})
Shear Ratio (V_{Ed}/V_{Rds})
Shear Ratio (V_{Ed}/V_{Rdmax})
Shear Ratio
Asw-H_{req}

	y : 3 (l)	z : 9 (l)
Applied Shear Force (V _{Ed})	39639.6 N	35434.7 N
Shear Ratio (V _{Ed} /V _{Rdc})	39639.6 / 438445 = 0.090	35434.7 / 437307 = 0.081
Shear Ratio (V _{Ed} /V _{Rds})	39639.6 / 837475 = 0.047	35434.7 / 991141 = 0.036
Shear Ratio (V _{Ed} /V _{Rdmax})	39639.6 / 1716750 = 0.023	35434.7 / 1741500 = 0.020
Shear Ratio	0.090 < 1.000 O.K	0.081 < 1.000 O.K
Asw-H _{req}	0.00393 mm ² /m, 2-P10 @40	0.00393 mm ² /m, 2-P10 @40

[MIDDLE]

Applied Shear Force (V_{Ed})
Shear Ratio (V_{Ed}/V_{Rdc})
Shear Ratio (V_{Ed}/V_{Rds})
Shear Ratio (V_{Ed}/V_{Rdmax})
Shear Ratio
Asw-H_{req}

	y : 10 (1/2)	z : 10 (1/2)
Applied Shear Force (V _{Ed})	472545 N	559460 N
Shear Ratio (V _{Ed} /V _{Rdc})	472545 / 414399 = 1.140	559460 / 412915 = 1.355
Shear Ratio (V _{Ed} /V _{Rds})	472545 / 478557 = 0.987	559460 / 566366 = 0.988
Shear Ratio (V _{Ed} /V _{Rdmax})	472545 / 1716750 = 0.275	559460 / 1741500 = 0.321
Shear Ratio	0.987 < 1.000 O.K	0.988 < 1.000 O.K
Asw-H _{req}	0.00222 mm ² /m, 2-P10 @70	0.00222 mm ² /m, 2-P10 @70

[JOINT]

V_{jhd} / V_{js}
Joint Ratio
Ash_{jnt}

	y : (l)	z : (l)
V _{jhd} / V _{js}	0.00000 / 0.00000 = 0.000	0.00000 / 0.00000 = 0.000
Joint Ratio	0.000 < 1.000 O.K	0.000 < 1.000 O.K
Ash _{jnt}	0.00000 mm ² , Not Use	0.00000 mm ² , Not Use

4. 新增厚度資料名稱欄位

Usage classification for the same thickness

- Properties > Section > Thickness

Thickness Data

Value | Stiffened |

Thickness ID 1

In-plane & Out-of-plane 0 m

In-plane 0 m

Out-of-plane 0 m

Plate Offset

Thickness Ratio

Local z 0

Value

Local z 0 m

Offset Distance

Properties

Material | Section | Thickness |

ID	Type	Thickness(m)	Offset
1	Value	150.000000	No
2	Value	150.000000	No
3	Value	150.000000	No
4	Value	200.000000	No
5	Value	200.000000	No

Thickness : 5

- 1 : 150
- 2 : 150
- 3 : 150
- 4 : 200
- 5 : 200

Midas Gen 2019 v2.2

Thickness Data

Value | Stiffened |

Thickness ID 5

Name Slab_01

In-plane & Out-of-plane 200 mm

In-plane 0 mm

Out-of-plane 0 mm

Plate Offset

Thickness Ratio

Local z 0

Value

Local z 0 mm

Offset Distance

Properties

Material | Section | Thickness |

ID	Name	Thickness(...)	Offset
1	Slab_1F	Value	150.000000
2	Slab_2F	Value	150.000000
3	Slab_roof	Value	150.000000
4	Wall_01	Value	200.000000
5	Slab_01	Value	200.000000

Thickness : 5

- 1 : 150 (Slab_1F)
- 2 : 150 (Slab_2F)
- 3 : 150 (Slab_roof)
- 4 : 200 (Wall_01)
- 5 : 200 (Slab_01)

Midas Gen 2020 v1.1

5. 可定義雙線性之面彈簧支承性質

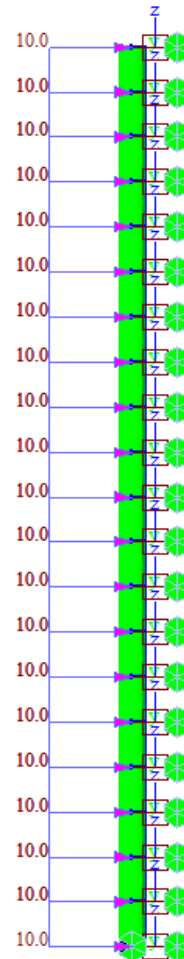
- Bilinear spring type is added in the Surface Spring Support to simulate the strength limit of the soil. The strength limit should be defined by the user.
- Both Point Spring Support and Elastic Link are supported.

Boundary > Spring Supports > Surface Spring

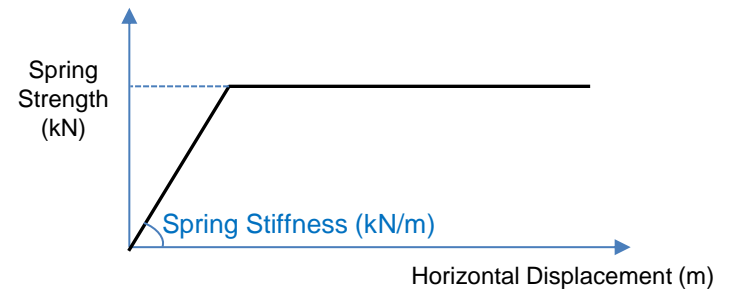
Surface Spring Supports dialog box configuration:

- Boundary Group Name: Default
- Surface Spring:
 - Convert to Nodal Spring
 - Point Spring
 - Elastic Link
 - Distributed Spring
- Element Type: Frame, Face #1
- Width: 0.6 m
- Spring Type: **Multi-linear (Bi)**
- Modulus of Subgrade Reaction:
 - Kx: 50000 kN/m³
 - Ky: 0 kN/m³
 - Kz: 0 kN/m³
 - PHU: 100 kN/m²
- Limit Strength: 100 kN/m²
- Length of Elastic Link: 1 m

Surface Spring Support



Horizontal Soil Stiffness(kN)

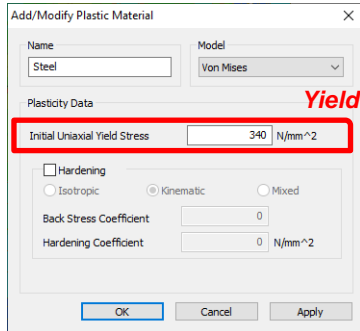


$$\text{Spring Strength [kN]} = \text{Section Width [m]} \times \text{Element Length [m]} \times \text{PHU [kN/m}^2\text{]}$$

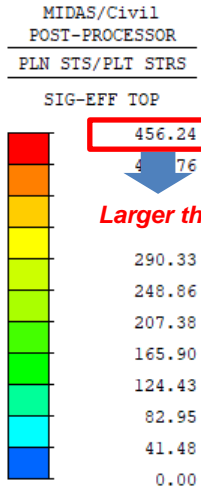
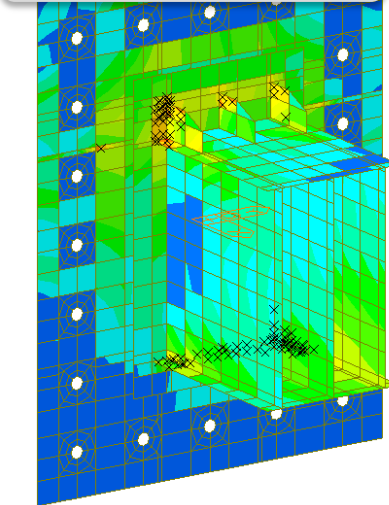
6. 新增顯示板元素分析結果之中心點數據

- Stresses at the node are determined by the linear interpolation of Gauss points, which often leads to stress exceeding yield stress in the material nonlinear analysis.
- Plate stress contour can now be displayed using the value at the element center instead of element nodes. The center values will not exceed the yield stress.

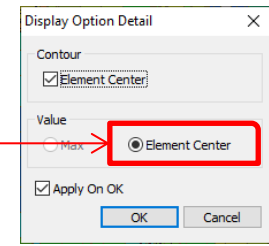
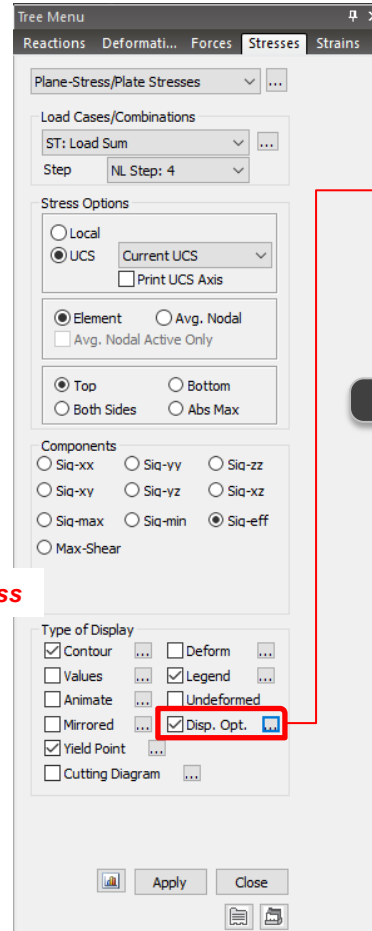
Results > Results > Stresses > Plane-Stress/Plate Stresses



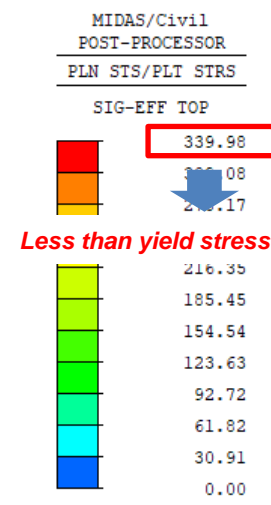
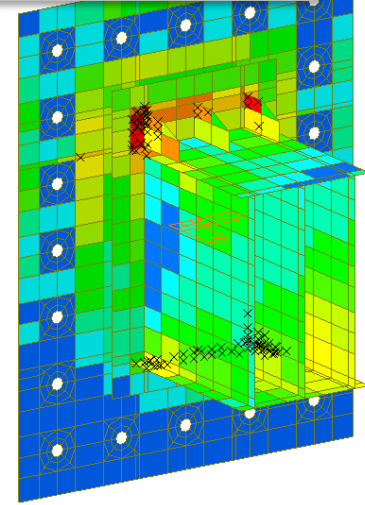
Without Center Contour option



Larger than yield stress



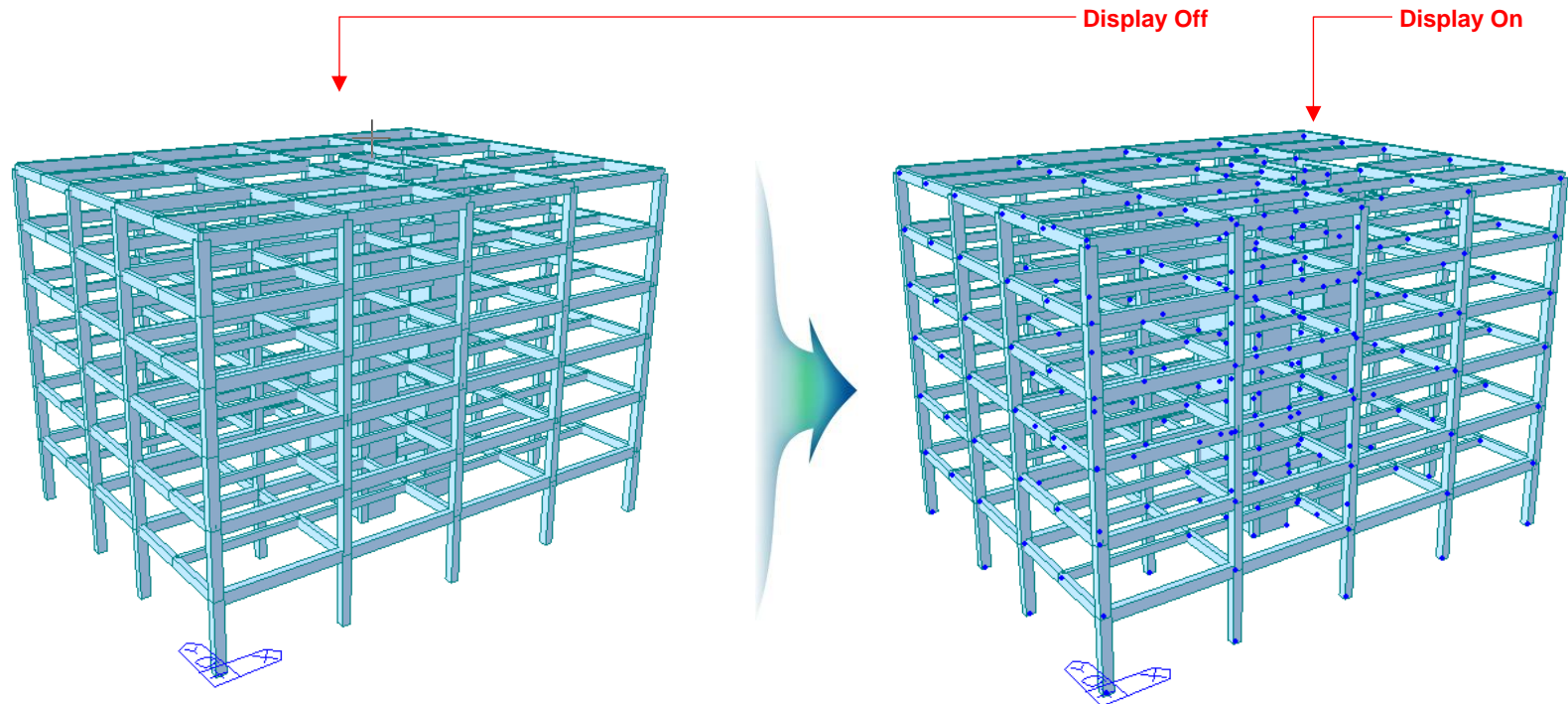
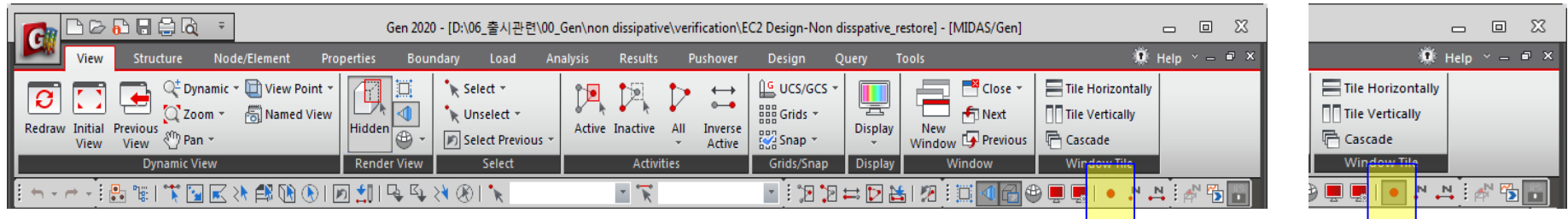
With Center Contour option



Less than yield stress

7. 新增節點顯示控制快捷鍵

Quick display on/off for Node



8. 新增NTC 2018規範之Non-Dissipative Element設計功能

In NTC 2018

NTC18 7.2.2. CRITERI GENERALI DI PROGETTAZIONE DEI SISTEMI STRUTTURALI

COMPORAMENTO STRUTTURALE

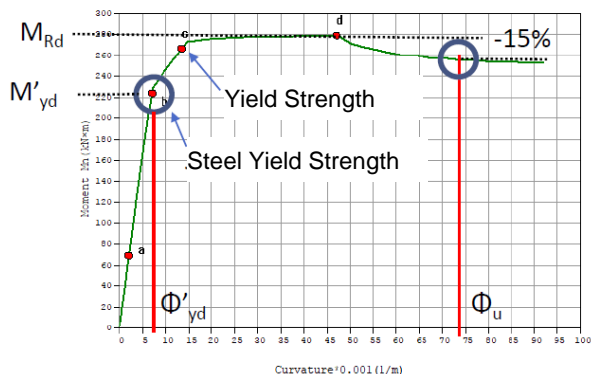
Le costruzioni soggette all'azione sismica, non dotate di appositi dispositivi d'isolamento e/o dissipativi, devono essere progettate in accordo con uno dei seguenti comportamenti strutturali:

- comportamento strutturale non dissipativo, oppure
- comportamento strutturale dissipativo.

7.4. COSTRUZIONI DI CALCESTRUZZO

7.4.1. GENERALITÀ

Nel caso di comportamento strutturale non dissipativo, la capacità delle membrature deve essere valutata in accordo con le regole di cui al § 4.1, senza nessun requisito aggiuntivo, a condizione che in nessuna sezione si superi il momento resistente massimo in campo sostanzialmente elastico, come definito al § 4.1.2.3.4.2. Per i nodi trave-pilastro di strutture a comportamento non dissipativo si devono applicare le regole di progetto relative alla CD "B" contenute nel § 7.4.4.3. Per le strutture prefabbricate a comportamento non dissipativo si devono applicare anche le regole generali contenute nel § 7.4.5.



Non-Dissipative Element Design (NDED)

$$M'_{yd} > M_{Ed}$$

M'_{yd} : Bending resistance in elastic status

M_{Ed} : Design bending moment by elastic load combinations

NTC18 7.2.2.

Buildings subject to seismic action, not equipped with appropriate insulation and / or dissipative devices, must be designed in accordance with one of the following structural behaviors:

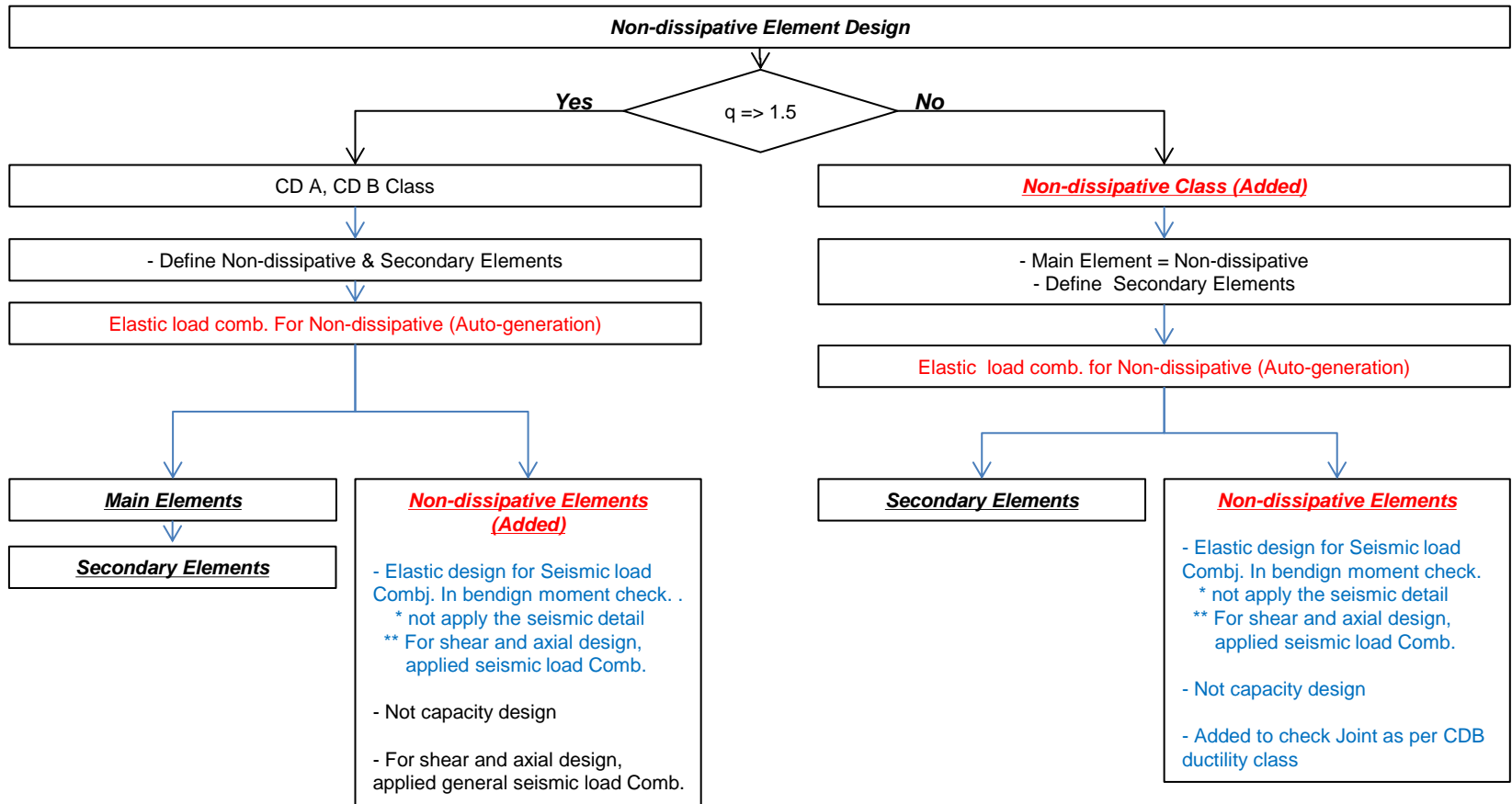
- non dissipative structural behavior, or
- dissipative structural behavior.

NTC18 7.4.1.

In the case of non-dissipative structural behavior, the capacity of the members must be evaluated in accordance with the rules set out in § 4.1, without any additional requirements, provided that in no section does the maximum moment of resistance in a substantially elastic field be exceeded, as defined in § 4.1.2.3.4.2. For beam-column Joint of structures with non-dissipative behavior, the design rules relating to CD "B" contained in § 7.4.4.3 must be applied. For prefabricated structures with non-dissipative behavior, the general rules contained in § 7.4.5 must also be applied.

8. 新增NTC 2018規範之Non-Dissipative Element設計功能

Flowchart of Non-dissipative Elements Design



** This release version is supporting only a beam, column and wall member in code checking

8. 新增NTC 2018規範之Non-Dissipative Element設計功能

Procedure of Non-Dissipative Element Design (NDED) – Response Spectrum

Define Inelastic material model

1 Input Inelastic Material Properties

Create seismic load for NDED

2 Create Seismic load for NDED

3 Create load combination for NDED

Design Setting for NDED

4 Define Non dissipative element

8. 新增NTC 2018規範之Non-Dissipative Element設計功能

Procedure of Non-Dissipative Element Design (NDED) – Static Seismic Load

Define Inelastic material model

Material ID: 3, Name: C30/37

Type of Design: Concrete

Type of Material: Isotropic

Create seismic load for NDED

2. Add Earthquake for Elastic (EE)

No	Name	Type	Description
1	DL	Dead Load (D)	
2	LL	Live Load (L)	
3	Ex	Earthquake (E)	
4	Ey	Earthquake (E)	
5	Ex_ND	Earthquake for Elastic (EE)	
6	Ey_ND	Earthquake for Elastic (EE)	

3. Create seismic load with EE

Load Case Name: Ex_ND

Seismic Load Code: Eurocode-3(2004)

Ground Type: B

Soil Factor(S): 1.2, Tb: 0.15, Tc: 0.5, Td: 2

Ref. Peak Ground Acc. (AgR): 0.08 g

Behavior Factor (q): 1.5

Lower Bound Factor (b): 0.2

Importance Factor (I): 1

Generate load combination for NDED

4. Create load combination for NDED

Option: Add

Code Selection: Concrete

Design Code: Eurocode2:04

National Annex: Italy

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

Generate Additional Load Combinations

For Non-Dissipative

Description	LoadCase	Factor
1.0D - 1.0(0.3L) + 1.0E	Rx_elastic design(NRS)	0.3000
1.0D - 1.0(0.3L) - 1.0E	DL(ST)	1.0000
1.0D - 1.0(0.3L) - 1.0E	DL(S)	1.0000
SERV - 1.0D + (1.0LL)	Ry_elastic design(NRS)	1.0000
SERV - 1.0D + (1.0LL)	Rz_elastic design(NRS)	1.0000
SERV - 1.0D + (1.0LL) + 1.5W		
SERV - 1.0D + (1.0LL) + 1.5WY		
SERV - 1.0D + (1.0LL) + 1.5WXY		
SERV - 1.0D + (0.7LL) + 1.5W		
SERV - 1.0D + (0.7LL) + 1.5WY		
SERV - 1.0D + (0.7LL) + 1.5WXY		

Design Setting for NDED

Design Code: Eurocode2:04

National Annex: Italy

Apply NTC: NTC2018

Apply Special Provisions for Seismic Design:

Strut Angle for Shear Resistance: 45 Deg

Effective Creep Ratio (Phi_cr): 2.143

Lambda_lim = 25/sqrt(n)

Beam-Column Joint Design: Gamma_rd = 1.1

Strong Column Weak Beam: SUM(M_Rc) > 1.3 * SUM(M_Rb)

Select Ductility Class: CD'B' (Medium Ductility)

Non-Dissipative Element: Non Diss.

Secondary Seismic Element: None

Friction Coefficient for Wall Sliding: 0.6

Moment Redistribution Factor for Beam: 1

Consider Shear Strength of Concrete for Checking: Wall, Column/Brace, Beam

Concrete

Rebar

1. Input Inelastic Material Properties

Plasticity Data: Plastic Material Name: NONE

Inelastic Material Properties for Fiber Model: Concrete: con, Rebar: rebar

Thermal Transfer: Specific Heat: 1000 J/(m³·°C), Heat Conduction: 0 J/(mm·hr·°F), Damping Ratio: 0.05

5. Define Non dissipative element

Non-Dissipative Element: Non Diss.

Secondary Seismic Element: None

Beam: 1.2, Column: 1.3, Wall: 1.2

8. 新增NTC 2018規範之Non-Dissipative Element設計功能

Design Result of Non-Dissipative Element Design (NDED) : Supporting only Design Checking

Design Result Table

Eurocode2:04 RC-Beam Checking Result Dialog

Code : Eurocode2:04,NTC2018 Unit : kN , m

Sorted by Member Property Results Strength Serviceability Primary Sorting Option SECT MEMB

MEMB	SECT	Span	Section			fck	fyk	PO S	CHK	Rebar		Negative Moment Strength				Positive Moment Strength				Shear Strength				Elastic Moment Capacity												
			Bc	Hc	fyk					AsTop	AsBot	N(-) M_Med	LC B	x/d	N(-) M_M_Rd	Rat-N	P(+) M_Med	LC B	x/d	P(+) M_M_Rd	Rat-P	V_Ed	LC B	V_Rdc	V_Rds	Rat-Vc	Rat-Vs	Rat-V	Seis. Class	N(-) M_Med	LC B	N(-) M_M_Rd	Rat-N	P(+) M_Med	LC B	P(+) M_M_Rd
0			travi	attez	20000.0	I	OK	0.0006	0.0006	0.0006	53.3142	10	0.09	108.928	0.49	26.6571	10	0.09	108.928	0.24	50.0967	2	57.9545	237.749	0.86	0.21	0.86	N.D.	21.849	19	98.401	0.22	10.925	19	98.401	0.11
2			0.300	0.500	450000	M	OK	0.0006	0.0006	0.0006	17.2613	10	0.09	108.928	0.16	19.2975	6	0.09	108.928	0.18	64.6646	11	57.9545	87.1748	1.12	0.74	0.74	N.D.	21.849	19	98.401	0.22	10.925	19	98.401	0.11
3.6000			0.000	0.000	450000	J	OK	0.0006	0.0006	0.0006	33.6289	10	0.09	108.928	0.31	19.8028	6	0.09	108.928	0.18	37.1465	2	57.9545	237.749	0.64	0.16	0.64	N.D.	21.849	19	98.401	0.22	10.925	19	98.401	0.11

Graphic Report

4. Shear Capacity

END-I	MED	END-J
10	11	2
50.10	64.66	37.15
57.95	57.95	57.95
237.75	97.17	237.75
359.55	359.55	359.55
0.0014	0.0005	0.0014
2-P10 #110	2-P10 #300	2-P10 #110
0.8644	1.1159	0.6410
0.2107	0.7418	0.1562
0.8644	0.7418	0.6410

5. Elastic Bending Moment Capacity (for Non-Dissipative Element)

END-I	MED	END-J
10	18	18
21.85	5.46	6.91
98.40	98.40	98.40
0.2220	0.0555	0.0703

Detail Report

(.) Applied bending moment.

(.) Calculate elastic moment strength.

No.	Conc.Strain	N.R.Depth	Bar.Strain	Curvature	Moment
1	0.000000	0.000000	0.000000	0.000000	0.00
2	0.000010	0.119903	-0.000005	1.528230e-004	0.68
3	0.000074	0.119904	-0.000019	6.202910e-004	18.69
4	0.000168	0.119907	-0.000091	1.402487e-003	41.95
5	0.000345	0.119910	-0.000378	2.402168e-003	74.32
6	0.000544	0.114579	-0.001377	3.895270e-003	106.76
7	0.000795	0.082909	-0.002964	5.400238e-003	138.41
8	0.000829	0.082425	-0.002959	7.435256e-003	118.17
9	0.000875	0.072719	-0.002660	9.400278e-003	111.47
10	0.000816	0.064635	-0.002116	1.267166e-002	113.82
11	0.000716	0.058000	-0.001607	1.558230e-002	114.37
12	0.001022	0.054217	-0.007839	1.985458e-002	115.97
13	0.001325	0.054076	-0.009111	2.243610e-002	117.56
14	0.001256	0.047651	-0.011221	2.420430e-002	119.25
15	0.001383	0.040274	-0.012972	3.054130e-002	121.82
16	0.001528	0.032851	-0.014908	3.468877e-002	122.48
17	0.001667	0.041782	-0.017882	3.989860e-002	124.88
18	0.001822	0.030802	-0.019336	4.402378e-002	124.56
19	0.001989	0.029480	-0.021739	5.088846e-002	129.14
20	0.002188	0.040651	-0.024559	5.425230e-002	128.24
21	0.002592	0.041687	-0.024781	6.232190e-002	131.78
22	0.002680	0.040937	-0.024904	6.871730e-002	134.24
23	0.002153	0.041882	-0.022294	7.541832e-002	136.46
24	0.002388	0.041187	-0.025204	8.240820e-002	138.72
25	0.002771	0.040287	-0.028132	8.725430e-002	140.91
26	0.003031	0.041394	-0.031782	9.208130e-002	143.41
27	0.003302	0.040850	-0.036295	1.020420e-001	146.82
28	0.003620	0.042999	-0.042369	1.105940e-001	147.46
29	0.003785	0.041219	-0.046816	1.224630e-001	148.58
30	0.011956	0.012235	-0.049436	1.318870e-001	146.26
31	0.010495	0.013295	-0.049314	1.402430e-001	144.95
32	0.024802	0.123753	-0.058252	1.497450e-001	144.54
33	0.022974	0.123253	-0.057872	1.603110e-001	145.56
34	0.022740	0.1217636	-0.053885	1.699470e-001	146.99
35	0.021862	0.121862	-0.050782	1.803110e-001	148.80
36	0.021902	0.162726	-0.054552	1.908810e-001	150.18
37	0.025594	0.124254	-0.059221	2.019660e-001	151.69
38	0.026592	0.128909	-0.061669	2.132270e-001	152.23
39	0.042746	0.189965	-0.063810	2.250880e-001	153.88
40	0.040874	0.187882	-0.180238	2.378867e-001	152.79

(.) Check ratio of elastic moment capacity.

$Rat_MEC = M_{Ed} / H_{yEd} = 0.222 < 1.000 \rightarrow$ D.H.

9. 優化NTC 2018規範之穩定係數表格

About NTC18 chap. 7.3.1 – (this is to consider in wishlist)

Effetti delle non linearità geometriche

Le non linearità geometriche sono prese in conto attraverso il fattore θ che, in assenza di più accurate determinazioni, può essere definito come:

$$\theta = \frac{P \cdot d_{ER}}{V \cdot h} \quad [7.3.3]$$

dove:

P è il carico verticale totale dovuto all'orizzontamento in esame e alla struttura ad esso sovrastante;

d_{ER} è lo spostamento orizzontale medio d'interpiano allo SLV , ottenuto come differenza tra lo spostamento orizzontale dell'orizzontamento considerato e lo spostamento orizzontale dell'orizzontamento immediatamente sottostante, entrambi valutati come indicato al § 7.3.3.3;

V è la forza orizzontale totale in corrispondenza dell'orizzontamento in esame, derivante dall'analisi lineare con fattore di comportamento q ;

h è la distanza tra l'orizzontamento in esame e quello immediatamente sottostante.

Gli effetti delle non linearità geometriche:

- possono essere trascurati, quando θ è minore di 0,1;
- possono essere presi in conto incrementando gli effetti dell'azione sismica orizzontale di un fattore pari a $1/(1-\theta)$, quando θ è compreso tra 0,1 e 0,2;
- devono essere valutati attraverso un'analisi non lineare, quando θ è compreso tra 0,2 e 0,3.

Il fattore θ non può comunque superare il valore 0,3.

Load Case	Story	Story Height (m)	Vertical Load (kN)	Story Shear Force (kN)	Modified Story Drift (m)	Beta (Beta)	Stability Coefficient (Theta)	Allowable Limit	Remark	P-Delta Incremental Factor (ad)
Cd=1, Ie=1, Scale Factor=2.5										
SLVx(RS)	5F	3.2	26503.4572	646.7074	0.0186	1	0.2384	0.3	P-Delta Direct Analysis	
SLVx(RS)	4F	3.2	43667.3343	994.4165	0.0208	1	0.2859	0.3	P-Delta Direct Analysis	
SLVx(RS)	3F	3.2	60831.2115	1267.5691	0.0202	1	0.3257	0.3	Redesign	
SLVx(RS)	2F	13.2	88294.3753	1658.6257	0.0521	1	0.1802	0.3	P-Delta Increment	1.2662
SLVx(RS)	1F	3.2	105458.2525	1690.8036	0.003	1	0.0583	0.3	OK	1

- If "Theta" is less than 0.1, "O.K" is printed
- If "Theta" exceeds 0.1 and is less than 0.2, "P-Delta Increment" is printed
- If "Theta" exceeds 0.2 and is less than 0.3, "P-Delta Direct Analysis" is printed
- If "Theta" exceeds 0.3, "Redesign" is printed

10. 新增NTC 2018規範之靜態地震力與反應譜

Static Seismic Load

Add/Modify Seismic Load Specification

Load Case Name : [...]
 Seismic Load Code : NTC2018

Description :

Seismic Load Parameters
 Ground Type : B

Spectrum Parameters
 T1 T2 T3 T4 User Defined

Soil Factor (S)	Tb	Tc	Td
1.20	0.14	0.42	1.63

Maximum Horizontal Acc. (ag) : 0.08 g
 Behavior Factor (q) : 1.5
 Amplification Factor (Fo) : 2.5
 Period of constant Hori.Acc. (Tc*) : 0.3

Structural Parameters
 Fundamental Period : X-Dir. 0.9787 Y-Dir. 0.9787

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

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

Torsional Amplification
 Accidental Eccentricity Inherent Eccentricity

Additional Seismic Loads (Unit:N,mm)

Story	Add-X	Add-Y	Add-RZ

Seismic Load Profile... OK Cancel Apply

Response Spectrum

Add/Modify/Show Response Spectrum Functions

Function Name : NTC2018 H-DESIGN

Import File Design Spectrum

Period (sec)	Spectral Data (g)
1	0.0000
2	0.0250
3	0.0500
4	0.0750
5	0.1000
6	0.1250
7	0.1399
8	0.1500
9	0.1750
10	0.2000
11	0.2250
12	0.2500
13	0.2750
14	0.3000

Spectral Data Type
 Normalized Accel.
 Scale Factor
 Maximum Value

Scaling
 Scale Factor
 Maximum Value

Generate Design Spectrum

Design Spectrum : NTC2018

Spectrum Type : Vertical Design Spectrum
 Horizontal Elastic Spectrum
 Vertical Elastic Spectrum
 Horizontal Design Spectrum
 T1 T4 User Defined

Soil Factor (S)	Tb	Tc	Td
1	0.05	0.15	1

Maximum Horizontal Acc. (ag) : 0.08 g
 Amplification Factor (Fo) : 2.5
 Period of constant Hor.Acc. (Tc*) : 0.3
 Behavior Factor (q) : 3

Max. Period : 2.5 (Sec)

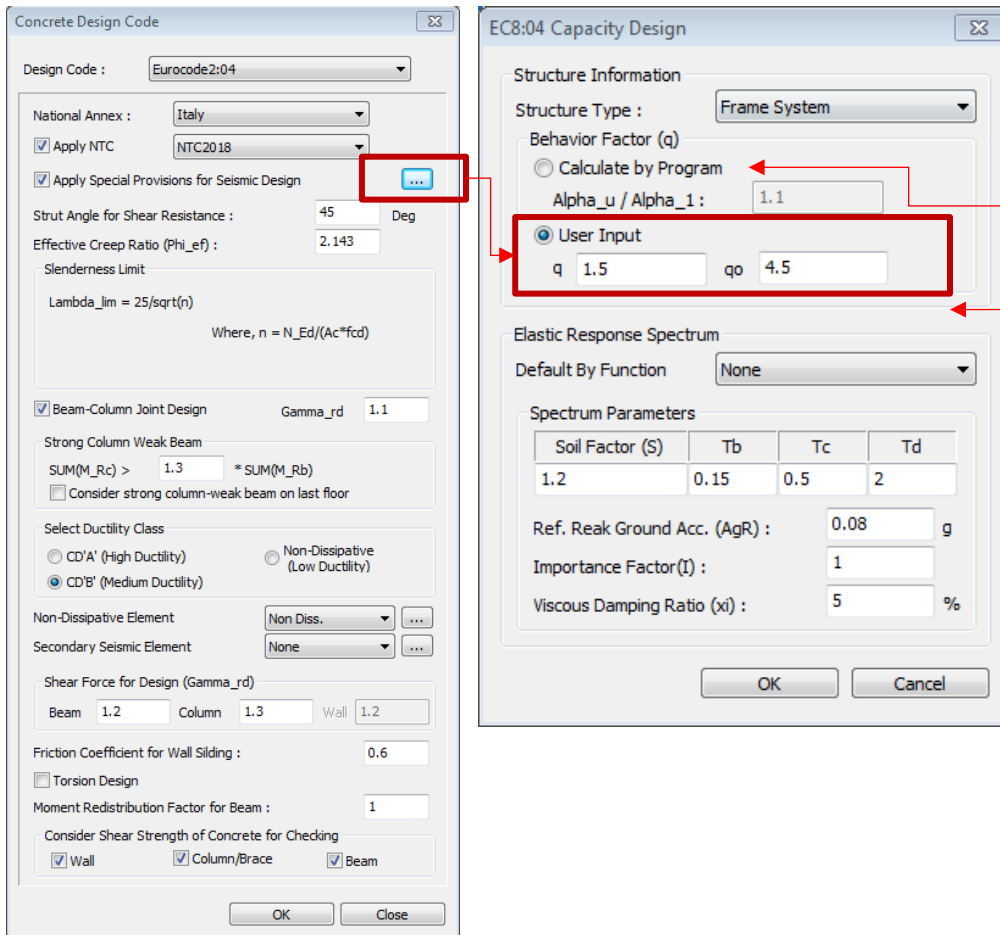
OK Cancel

Description : NTC2018 H-DGN: G=B,S=1.20,Tb=0.14,Tc=0.42,Td=1.63,ag=0.08g,Fo=2.5,Tc*=0.30,q=3.00

OK Cancel Apply

11. 新增EC2規範之RC設計的“qo”參數

- Definition of “qo” by user
- Design considering “qo” for irregular structures



Eurocod 08. Table 5.1

$$q = q_o k_w \geq 1,5$$

Table 5.1: Basic value of the behaviour factor, q_o for systems regular in elevation

STRUCTURAL TYPE	DCM	DCH
Frame system, dual system, coupled wall system	3.0 α ₀ /α ₁	4.5 α ₀ /α ₁
Uncoupled wall system	3,0	4.0 α ₀ /α ₁
Torsionally flexible system	2,0	3,0
Inverted pendulum system	1,5	2,0

(3) For buildings which are not regular in elevation, the value of q_o should be reduced by 20% (see 4.2.3.1(7) and Table 4.1).

midas **Design+**

1. 新增AISC規範之螺栓彎矩接合設計檢核功能

Supporting AISC-URFD05(M) / AISC-URFD10(M) / AISC-URFD16(M)

Auto-Generation of Detail/Summary Report

Auto-Generation of Drawing

MC01 (W24X55)

1. Calculation Summary

(1) General requirement

Category	Value	Criteria	Ratio	Note
Required girder stiffener thickness (mm)	-	-	-	-
Required girder stiffener length (mm)	-	-	-	-
Required - thickness ratio of Girder stiffener	-	-	-	-
No prying bolt moment strength (kN-m)	0.000	420	0.000	-

(2) End Plate

Category	Value	Criteria	Ratio	Note
Required end plate thickness (mm)	18.28	6.000	3.046	-
Shear yielding strength of end plate (kN)	0.000	161	0.000	-
Shear rupture strength of end plate (kN)	0.000	171	0.000	-

(3) High Tension Bolt

Category	Value	Criteria	Ratio	Note
Shear rupture strength of compression bolts (kN)	0.000	283	0.000	-
Bolt bearing / tear out failure of end plate (kN)	0.000	329	0.000	-
Bolt bearing / tear out failure of column flange (kN)	0.000	1,825	0.000	-

(4) Column Flange

Category	Value	Criteria	Ratio	Note
Required thickness of column flange for flexural yielding (mm)	33.27	11.82	0.355	-

(5) Stiffener

Category	Value	Criteria	Ratio	Note
Strength of unstiffened column flange (kN)	0.000	4,721	0.000	-
Local web yielding strength (kN)	0.000	1,569	0.000	-
Web buckling strength (kN)	0.000	4,041	0.000	-
Web crippling strength (kN)	0.000	2,996	0.000	-

2. Calculate Design Forces

(1) Calculate the expected yield stress

- $F_y = 248\text{MPa}$
- $Z_x = 2,195,867\text{mm}^3$
- $M_{px} = 1.1 R_y F_y Z_x = 899\text{kN-m}$

(2) Calculate the distance from the face of the column to the plastic hinge

- $d = 599\text{mm}$
- $b_w = 12.83\text{mm}$
- $L_p = \min (d/2, 3b_w) = 38.46\text{mm}$

END PLATE 8 x 31 (A36)

BOLT (TOP) 4 - 3/4 (A325M)

BOLT (BOT.) 4 - 3/4 (A325M)

STIF. (TOP) -

STIF. (BOT.) -