

Release Note

Release Date : Feb. 2025

Product Ver. : CIVIL NX 2025 (v1.1)



DESIGN OF CIVIL STRUCTURES

Integrated Solution System for Bridge and Civil Engineering

Enhancements

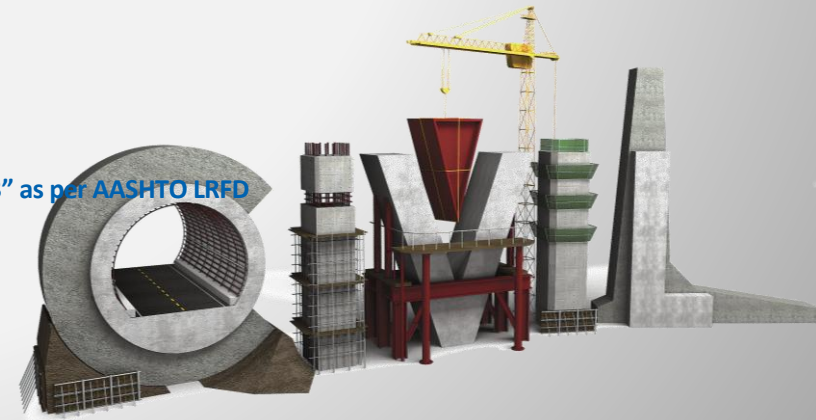
Enhancements in CIVIL NX 2025 (v1.1)

- Pre & Post processing

- 1.CQC 3 Directional Combination for Response Spectrum
- 2.Considering Elastic/General Link Forces in Moving Load Tracer
- 3.B-double rating vehicle as per AS 5100.7
- 4.Considering two trucks for substructure members or Elastic/General Link as per AASHTO LRFD Vehicle Loads
- 5.Moving patch load analysis as per AASHTO LRFD traffic loads
- 6.IRC Fatigue Vehicle
- 7.Time Dependent Materials as per SP/M/022 v 3.4, AS5100.5:2017(Amd 2:2024) and AS3600:2018(Amd 2)
- 8.Addition of Response Spectrum Function as per DPT.1301/1302-61:2018 and Eurocode Malaysia NA
- 9.Addition of H and Channel shape section database as per EN 10365
- 10.Addition of new Design Spectrum Database in Artificial Earthquake Data Generator
- 11.Addition of Element Stiffness Scale Factor

- Design

12. RC Design for 1D Beam & Column, Plate Beam & Column as per BS 5400
13. RC & Steel Design as per CSA S6:19
14. Response Modification Factor by members and components as per AASHTO LRFD
15. Addition of an option “Long-term Section Property of Cracked Composite Section: Rebar Area/3” as per AASHTO LRFD



Enhancements

Enhancements in CIVIL NX 2025 (v1.1)

-Including all updates written in the previous pages, and

16. Enhancements in midas GSD

- Prestressed general section check
- Multiple materials for composite section or section rehabilitation

17. Eurocode 22 National Annexes for RC and PSC Design

18. Enhancements in Output Table Performance and Visual Design

19. Updates to Default Settings of the Custom Toolbar

20. Grasshopper Plug-in

21. Excel Add-in with MCT

22. Import and export function in Load Combinations

23. Improvements to Element Color Display for Structural Groups



1. CQC 3 Directional Combination for Response Spectrum

- The CQC3 rule has been developed to estimate the peak value of the combined response due to simultaneous application of the principal components of ground motion.
- The user defines the ratio (γ) of minor to major spectrum, and the program finds the critical angle and provides the maximum response for each component.

▪ Load > Dynamic Loads > RS Load Cases

Response Spectrum Load Cases

Spectrum Load Case

Load Case Name

DirectionX-Y

Excitation Angle0

[deg]

Directional Combination(CQC3)

Ratio of minor to major spectrum0.3

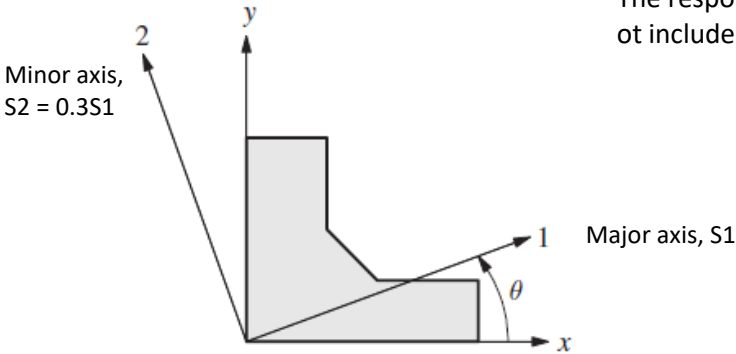
Scale Factor1

Period Modification Factor1

Modal Combination Control

Response Spectrum Load Cases

$$\theta_{cr} = \frac{1}{2} \tan^{-1} \left(\frac{2r_{xy}}{r_x^2 - r_y^2} \right)$$
$$r_{cr} \equiv r_{max} \simeq \left[(1 + \gamma^2) \left(\frac{r_x^2 + r_y^2}{2} \right) + (1 - \gamma^2) \sqrt{\left(\frac{r_x^2 - r_y^2}{2} \right)^2 + r_{xy}^2 + r_z^2} \right]^{1/2}$$



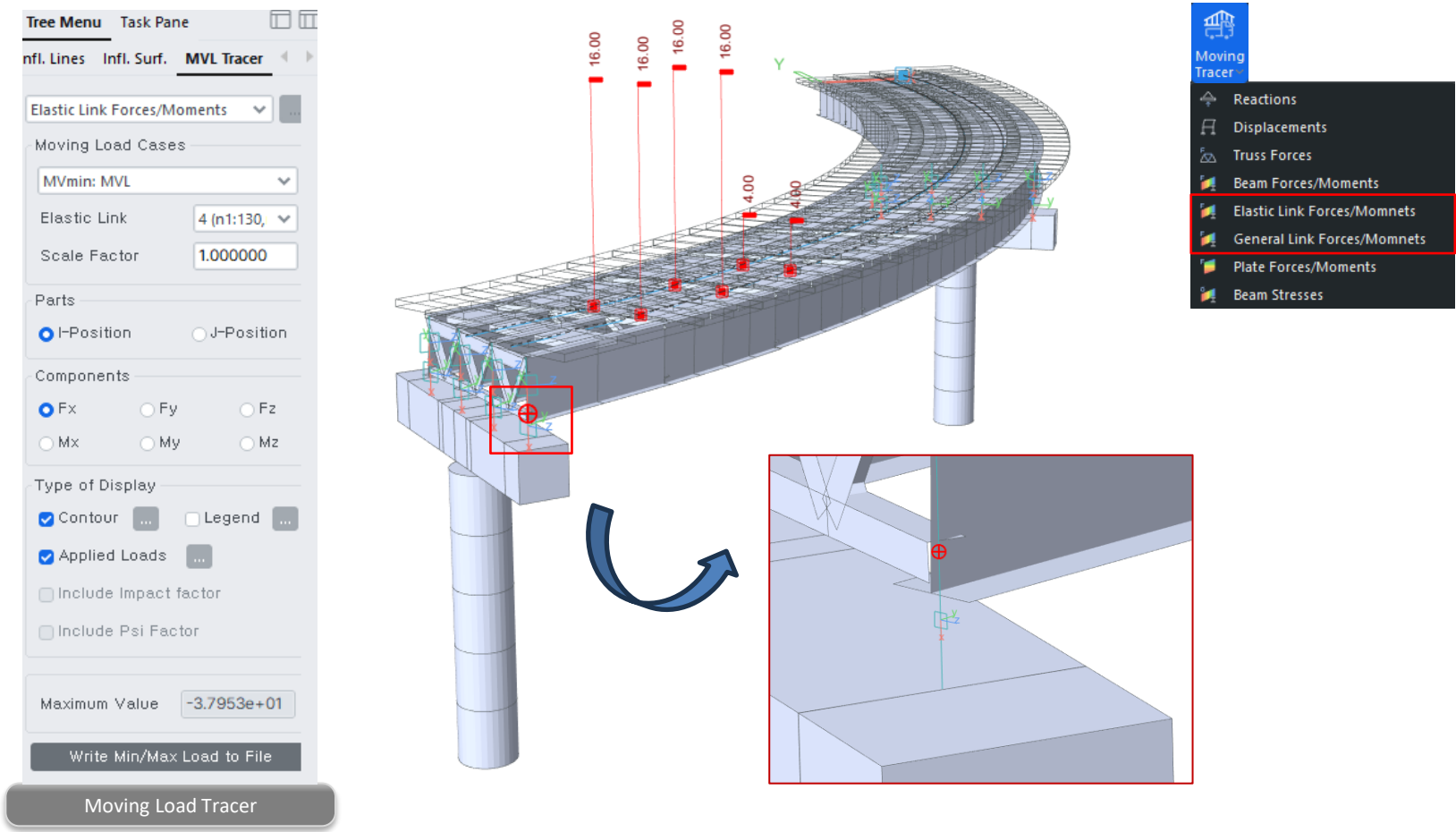
The responses due to vertical ground motion, r_z are not included in the CQC3 results.

1 and 2: principal axes of ground motion

2. Considering Elastic/General Link Forces in Moving Load Tracer

- Bridge bearings are often simulated with Elastic Links or General Links to represent the stiffness of the bearings.
- Now, Moving Load Tracer supports Elastic Links and General Links to find the critical position of the vehicle loads and to convert it into equivalent static loads.

- **Results > Analysis Result > Moving Tracer > Elastic Link Forces/Moments**
- **Results > Analysis Result > Moving Tracer > General Link Forces/Moments**



3. B-double rating vehicle as per AS 5100.7

- A B-double is defined in the Heavy Vehicle National Law (HVNL) as a combination consisting of a prime mover towing two semitrailers.
- New B-double assessment vehicle DB for Queensland(QLD) and Victoria(VIC) is now available. More than 2 B-double vehicles can be loaded by checking on the option in Moving Load Analysis control.

▪ Load > Moving Load > Moving Load Code : Australia

Define Moving Load Case

Load Case Name: QLD50.5 8G1

Description:

☐ Load Case for Permit Vehicle

☐ Moving Load Optimization

Select Load Model

☐ General

☐ Fatigue

☐ Heavy Load Platform

☐ Rail Traffic Load

☒ B-Double Load

Accompanying Lane Factor

Num of Loaded Lanes: 1, Scale Factor: 1

2, 0.8

3 or more, 0.4

Load Case Data

B-Double Load: QLD-50.5T 8G1 GML 19m B

M1600 or S1600: S1600

Assignment Lanes

Loaded Lane of M1600 or S1600

Min. Number of Loaded Lanes: 0

Max. Number of Loaded Lanes: 1

Line of Lanes: L3, L4, L5, L6

Selected Lanes: L1, L2

B-Double Lanes: L1

OK, Cancel, Apply

Moving Load Analysis Control Data

Truck/Train Load Control Option

Analysis Method: ☒ Exact, ☐ Pivot, ☐ Quick

Load Point Selection: ☒ Influence Line Dependent Point, ☐ All Points

Influence Generating Points: ☒ Number/Line Element: 3, ☐ Distance between Points: 0.3 m

Analysis Results

Plate: ☐ Center, ☒ Center + Nodal, ☒ Stress, ☒ Concurrent Force

Frame: ☐ Normal, ☒ Normal + Concurrent Force/Stress, ☒ Combined Stress

☒ Concurrent Force of Elastic/General Links

Calculation Filters

☒ Reactions: ☒ All, ☐ Group

☒ Displacements: ☒ All, ☐ Group

☒ Forces/Moments: ☒ All, ☐ Group

☒ Elastic/General Links: ☒ All, ☐ Group

☒ Apply Multiple B-Double Trucks in the Same Lane

Maximum Successive Vehicles: 10

OK, Cancel

Define Standard Vehicular Load

Standard Name: AS 5100.7 - Rating Vehicles

Vehicular Load Properties

Vehicular Load Name: QLD-50.5T 8G2 GML 19m B DOUBLE

Vehicular Load Type: QLD-50.5T 8G2 GML 19m B DOUBLE

P1

P2

K

D1

VIC-45.5T HML B DOUBLE

VIC-68T HML B DOUBLE

QLD-50.5T 8G1 GML 19m B DOUBLE

QLD-50.5T 8G2 GML 19m B DOUBLE

QLD-62.5T 7G GML B DOUBLE

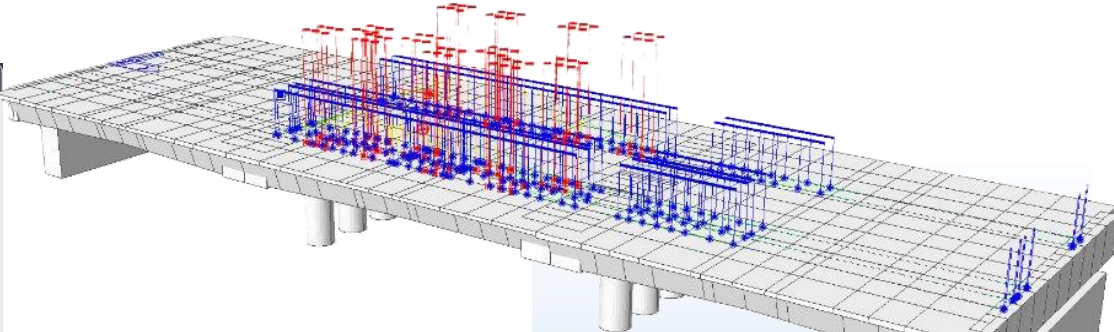
QLD-68T 7H HML B DOUBLE

No	Load(kN)	Spacing(m)
1	63.8	3
2	80.95	1.2
3	80.95	5.5
4	67.5	1.2
5	67.5	5.5
6	67.5	1.2
7	67.5	end

Min.Distance Between Vehicles: ☐ Slow Moving (8.0 m), ☒ Normal Moving (17.0 m)

Dynamic Load Allowance: ☒ Auto, ☐ User: 0.4

OK, Cancel, Apply



National Class 2 B-double Operator's Guide
May 2019

Moving Load Cases

Moving Load Analysis Control

MB-double Vehicles

4. Considering two trucks for substructure members or Elastic/General Links as per ASHTO LRFD vehicle loads

- Although AASHTO LRFD says, "For negative moment between points of contraflexure under a uniform load on all spans, 90 percent of the effect of two design trucks combined with 90 percent of the effect of the design lane load, force components other than negative moment need to be determined based on the two-truck rule in some projects.
- Now, it is possible to select elements or links to apply the two-truck rule to obtain maximum results for all force components in moving load analysis.

▪ Load > Moving Load > Lane Support > Lane Support All Forces/Moments

Tree MenuTask Pane

Infl. LinesInfl. Surf.MVL TracerBatc

Beam Forces/Moments

Moving Load Cases

MVmin: MVL

Key Element338

Scale Factor1.000000

Parts

☒ i☐ 1/4☐ 1/2

☐ 3/4☐ j

Components

☒ Fx☐ Fy☐ Fz

☐ Mx☐ My☐ Mz

☐ Mb☐ Mt☐ Mw

Type of Display

☒ Contour...☐ Legend...

☒ Applied Loads...

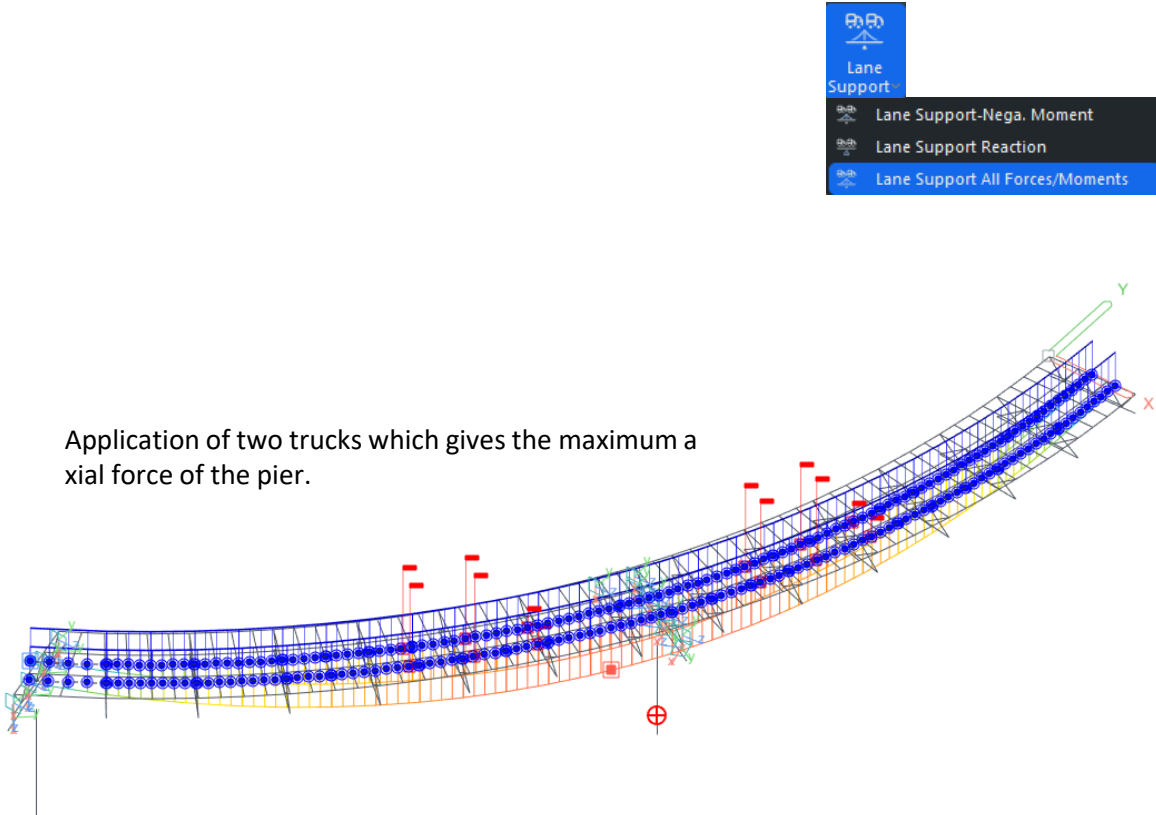
☐ Include Impact factor

☐ Include Psi Factor

Maximum Value-3.0561e+02

Write Min/Max Load to File

Moving Load Tracer



Lane Support

Lane Support-Nega. Moment

Lane Support Reaction

Lane Support All Forces/Moments

Tree MenuTask Pane

Moving Load

Lane Supports(All Forces/Mom)

Option

☒ Add☐ Delete

Type

☒ Truss☐ Beam☐ Plate

☐ Elastic Link☐ General Link

Select 2 Nodes

No	ID	Type
1	324	Beam
2	335	Beam
3	336	Beam
4	337	Beam
5	338	Beam
6	11	Elastic Link
7	13	Elastic Link
8	15	Elastic Link
9	17	Elastic Link

Lane Support
All Forces/Moments

5. Moving patch load analysis as per AASHTO LRFD traffic loads

- The tire contact area of a wheel can be applied during moving load analysis. In this version, HL-93TRK, HL-93TDM, and HS20-FTG vehicles of AASHTO LRFD are only supported.
- The design forces of plate elements can be noticeably reduced with the patch/area loads compared to concentrated wheel loads.

▪ Load > Moving Load (AASHTO LRFD) > Vehicles

Define Standard Vehicular Load

Standard Name

AASHTO LRFD Load

Vehicular Load Properties

Vehicular Load Name

HL-93TRK

Vehicular Load Type

HL-93TRK

Dynamic Load Allowance

33

%

(a)

P1

P2

P3

w

D1

D2

D3

(b)

P1

P2

P3

P1

P2

P3

x

r

D1

D2

Dist

D1

D2

Lane Support-Neg. Moment / Reaction

Application

Not assigned

a

Assigned

a,b

No

Load(kips)

Spacing(in)

1

8

168

2

32

168

3

32

360

W

0.0533333

kips/in

r

90

%

Dist.

600

in

Consider Contact Area

Width

20

in

Length

10

in

Add Centrifugal Force

OK

Cancel

Apply

Standard Vehicle

Concentrated wheel loads

Patch/area wheel loads

Define User Defined Vehicular Load

Load Type

Truck/Lane

Legal/Permit Load

Train Load

Permit Truck

Vehicular Load Properties

Vehicular Load Name

HL-93TRK Patch

Truck Load

P1

P2

P3

Pn-1

Pn

w

D1

D2

...

Min Dn-1

Max Dn

Lane Load

PL

PLM

PLV

w

...

...

Truck Load

P#

D#

No

Load(kips)

Spacing(in)

1

8

168

2

32

168

3

32

360

Add

Insert

Modify

Delete

Lane Load

w

0

kips/in

PL

0

kips

PLM

0

kips

PLV

0

kips

Add Centrifugal Force

Consider Contact Area

Width

20

in

Length

10

in

OK

Cancel

Apply

User-Defined Vehicle

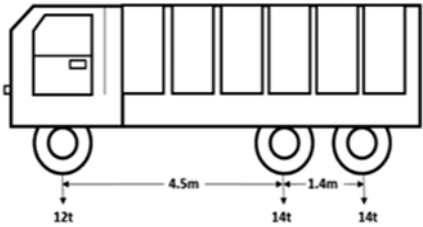
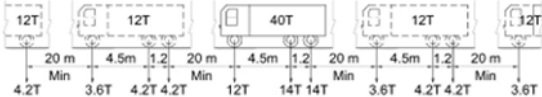
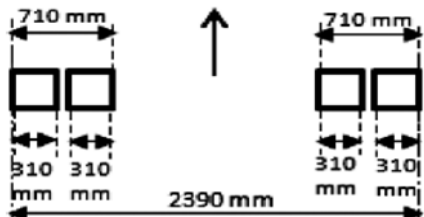
MIDAS

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6. Fatigue Vehicle to IRC 6 : Standard Load

- Fatigue Vehicle has been added to existing vehicle library of IRC 6 : Standard Load as per latest amendment to IRC : 6 Fatigue Load Clause 204.6.
- For assessment, impact factor has been replaced with surface roughness impact depending upon type of surface.

▪ **Load > Load Type > Moving Load > Moving Load Code > India**

S. No.	Claus e No.	AS EXISTS IN THE CODE	PROPOSED NEW CLUAUSE / MODIFICATION	REMARKS
		longitudinal direction of the bridge, shall be used for fatigue assessment with the fatigue load so positioned as to have worst effect on the detail or element of the bridge under consideration. The minimum clearance between outer edge of the wheel of the fatigue vehicle and roadway face of the kerb shall be 150 mm.  Fig. 7A: Fatigue Truck	increased by a dynamic amplification factor, I_{ef} as given below: $I_{ef} = 1.3(1-x/26) > 1.0$ where x = distance of section/detail from nearest expansion joint.  Fig. 7A : Fatigue Load Train NOTE: 1. Fatigue truck of 40 T must be included in Fatigue Load Train 2. Only such number of additional 12 T trucks shall be included in train as can be accommodated in influence line of detail under consideration Direction of Motion  max tyre pressure 5.273kg/cm² Fig. 7B: T Arrangement Transverse Wheel Spacing and Tyre Fig. 7: Fatigue Load (40T) The stress range resulting from the single passage of	second/more vehicles in lane included in line with Euro codes.

Define Standard Vehicular Load

Standard Name

IRC:6 Standard Load

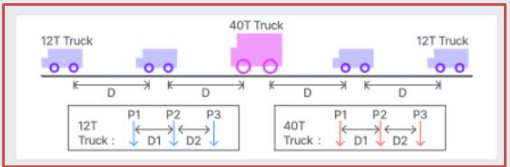
Vehicular Load Properties

Vehicular Load Name

Fatigue Vehicle

Vehicular Load Type

Fatigue Vehicle



Vehicular Load

Axle Loads of 12T Truck

No	Load(kN)	Spacing(m)
1	35.3039	4.5
2	41.1879	1.2
3	41.1879	end

Minimum Distance:
n 30 m

Axle Loads of 40T Truck

No	Load(kN)	Spacing(m)
1	117.68	4.5
2	137.293	1.2
3	137.293	end

Surface Roughness Impact

☐ Surface of good roughness (1.2)

☒ Surface of medium roughness (1.4)

☐ User define 1

OK

Cancel

Apply

6. Fatigue Vehicle to IRC 6 : Standard Load

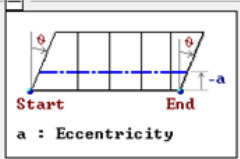
- The Traffic Lane Definitions now include an "EJ" checkbox for specifying expansion joint locations.
- For sections/ details within 6.0 m of the expansion joint, the fatigue load arrived as above shall further be increased by a dynamic amplification factor, I_{ej} .

▪ **Load > Load Type > Moving Load > Moving Load Code > India**

Define Design Traffic Line Lane

Lane Name : Fatigue Load

Traffic Lane Properties



Start End

a : Eccentricity

Eccentricity : 0 m

Wheel Spacing: 1.68 m

☒ IF/CDA : 1

☐ Span Length : 0 m

Vehicular Load Distribution

☒ Lane Element ☐ Cross Beam

Cross Beam Group

Skew

Start 0 End 0 [deg]

Moving Direction

☐ Forward ☐ Backward ☒ Both

Selection by

☒ 2 Points ☐ Picking ☐ Number

23.25, 0, 0 m

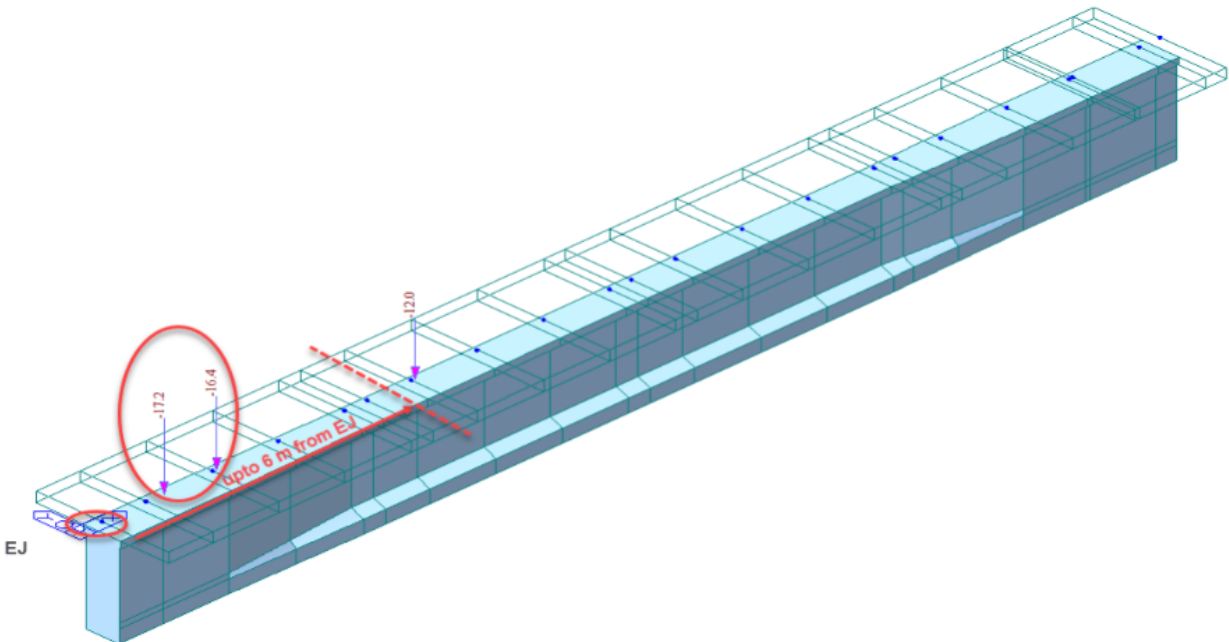
24.475, 0, 0 m

Operations

Add Insert Delete

No	Eccen. (m)	Span (m)	IF/CDA	EJ
1	0	-	1	☒
2	n	-	1	☐

OK Cancel Apply



$$I_{ej} = 1.3 \left(1 - \left(\frac{x}{26} \right) \right) \geq 1$$

x = distance of section/detail from nearest expansion joint

7. Time Dependent Materials as per the latest Australian and New Zealand Standards

- Time Dependent Materials (Creep, Shrinkage and Compressive Strength) as per the following Australian and New Zealand Standards are updated: SP/M/022 v 3.4, AS5100.5:2017(Amd 2:2024) and AS3600:2018(Amd 2).

- **Properties > Time Dependent Material > Creep/Shrinkage**
- **Properties > Time Dependent Material > Comp. Strength**

Add/Modify Time Dependent Material (Creep / Shrinkage)

Name : C35

Code : AS 3600-2018 Amd 2:2021

AUSTRALIA

Compressive strength of concrete at the age of 28 days : 35 N/mm²

Exposure Environment
☒ Arid ☐ Interior

Hypothetical Thickness :
h = 2 Ag / u (Ag : Section Area, u : Perimeter in contact with atmosphere)

Drying Basic Shrinkage Strain (10⁻⁶) (390~1100)
☒ 800.0 ☐ User Define

Age of concrete at the beginning of shrinkage : 3 day

Add/Modify Time Dependent Material (Creep / Shrinkage)

Name : C35

Code : AS 5100.5-2017 Amd 2:2024

AUSTRALIA

Compressive strength of concrete at the age of 28 days : 35 N/mm²

Exposure Environment
☒ Arid ☐ Interior ☐ Temperate Inland ☐ Tropical or Near Coastal

Hypothetical Thickness :
h = 2 Ag / u (Ag : Section Area, u : Perimeter in contact with atmosphere)

Drying Basic Shrinkage Strain (10⁻⁶) (390~1100)
☒ 800.0 ☐ User Define

Age of concrete at the beginning of shrinkage : 3 day

Add/Modify Time Dependent Material (Creep / Shrinkage)

Name : C35

Code : NZ Bridge(SP/M/022 Amd 4:2022)

New Zealand

Compressive strength of concrete at the age of 28 days : 35 N/mm²

Relative Humidity Factor for Shrinkage (0.21~0.74) : 0.74

Hypothetical Thickness : 100 mm
h = 2 Ag / u (Ag : Section Area, u : Perimeter in contact with atmosphere)

Drying Basic Shrinkage Strain (10⁻⁶) (390~1100)
720(Wangarei, Auckland Hunua, Hamilton) 720

Age of concrete at the beginning of shrinkage : 3 day

Modification factor for aggregate type (0.8~1.4) : 1

Add/Modify Time Dependent Material (Creep / Shrinkage)

Name : C35

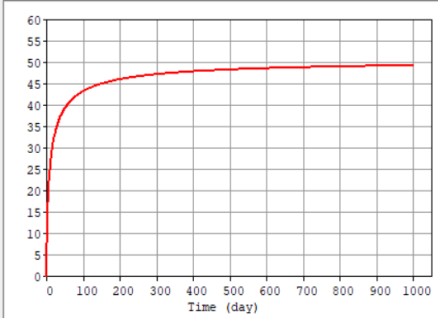
Code : AS 3600-2018 Amd 2:2021

Type
☒ Code ☐ User

Development of Strength
Concrete Compressive Strength at 28 Days (f28) : 35 N/mm²

Scale Factor : 1.0

Graph Options
☐ X-axis log scale ☐ Y-axis log scale



Redraw Graph

OK Cancel

Creep & Shrinkage

Compressive Strength

8. Addition of Response Spectrum Function as per DPT.1301/1302-61:2018 and Eurocode Malaysia NA

- Design Spectrums for Thailand specifications(DPT.1301/1302-61:2018) and Eurocode Malaysian National Annex are added.

Load > Dynamic Loads > RS Functions

Generate Design Spectrum

Design Spectrum DPT.1301/1302-61:2018

Region

☒ Bangkok

☐ Regeion except Bangkok

Method

☐ By Graph 1.4.6~7

☐ By Table 1.4-4~5

Seismic Zone

Seismic Zone 1

Design Spectral Acceleration

Site Class Sd

☐ by Code

Ss 0.750 S1 0.300

Fa 1.2 Sd1 0.6 g

Fv 1.8 Sd1 0.36 g

Category

Risk Category II

Importance 1.00

Structural Parameters

Response Mod. Factor 4.00

Damping Ratio 0.025

OK Cancel

Generate Design Spectrum

Design Spectrum Eurocode-8(2004)

National Annex Malaysia

Spectrum Type Horizontal Elastic Spectru

Ground Type B

Region Peninsular

Spectrum Parameters

☒ Shallow ... ☐ Deep S... ☐ User Defined

Soil Factor (S) Tb Tc Td

1.4 0.05 0.3 2.2

Ref. Peak Ground Acc. (AgR) 0.08 g

Importance Factor (I) 1.0

Viscous Damping Ratio (xi) 5 %

Max. Period 6 (Sec)

OK Cancel

Add/Modify/Show Response Spectrum Functions

Function Name EURO2004 H-ELASTIC

Spectral Data Type

☒ Normalized Accel.

☐ Acceleration

☐ Velocity

☐ Displacement

Scaling

☒ Scale Factor 1

☐ Maximum Value 0 g

Gravity 9.806 m/sec²

Damping Ratio 0.05

Graph Options

☐ X-axis log scale

☐ Y-axis log scale

	Period (sec)	Spectral Data (g)
1	0.0000	0.1120
2	0.0500	0.2800
3	0.0600	0.2800
4	0.1200	0.2800
5	0.1800	0.2800
6	0.2400	0.2800
7	0.3000	0.2800
8	0.3600	0.2333
9	0.4200	0.2000
10	0.4800	0.1750
11	0.5400	0.1556
12	0.6000	0.1400
13	0.6600	0.1273
14	0.7200	0.1167
15	0.7800	0.1077
16	0.8400	0.1000
17	0.9000	0.0933
18	0.9600	0.0875
19	1.0200	0.0824

Spectral Data

0.248128

0.198128

0.148128

0.0981275

0.0481275

-0.0018725

0.01

1.01

2.01

3.01

4.01

5.01

6.01

Period (sec)

Description EURO2004 H-ELA: G=B,S=1.40,Tb=0.05,Tc=0.30,Td=2.20,AgR=0.08g,I=1.0,Damping=5.00

OK Cancel Apply

DPT1301/1302-61 Design Spectrum

MY EN 1998 Design Spectrum

Response Spectrum Function

MIDAS

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9. Addition of new Design Spectrum Database in Artificial Earthquake Data Generator

- AGS (Artificial Data Generation System for windows) extracts artificial earthquake and design response spectrum using the design spectrum of each standard. Following design spectra are now added: Taiwan (2022), IS1938(2016), NSR-10, P100-1(2013), NTC 2018, DBWH-LRFD BDS(2013), AS 5100.2(2017), IRC:SP:114-2018, KBC(2016), China (GB/T 51408-2021), China(JTG/T 2231-01-2020), China (GB50011-2019), China (CJJ 166-2011), Japan(Bridge2017), Japan(Bridge 2012)

- **Tools > Data Generator > Artificial Earthquake**

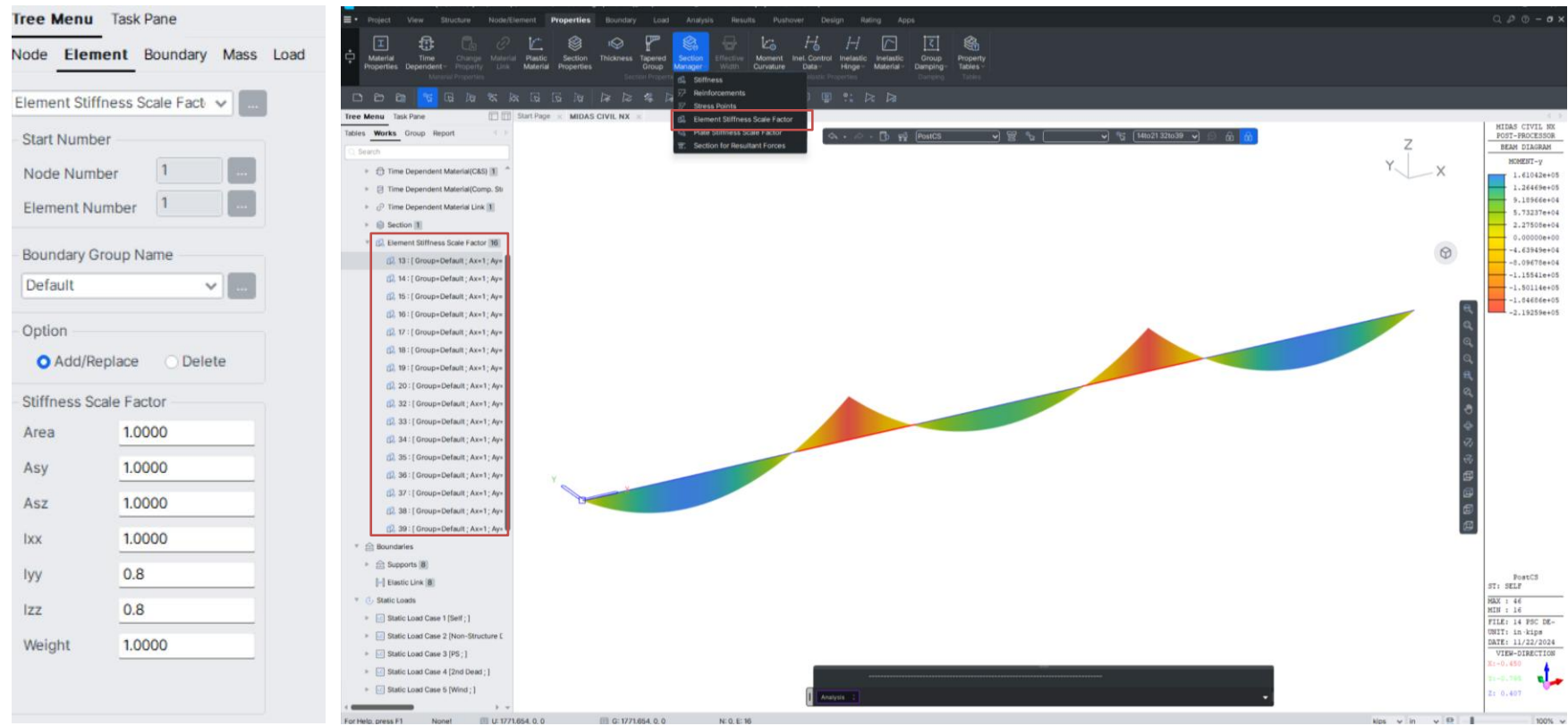
The figure displays three screenshots of software interfaces for artificial earthquake generation:

- Left Screenshot:** The "Generate Design Spectrum" dialog box. It features a "Design Spectrum" dropdown menu showing a list of standards, including "China(GB/T 51408-2021)". Other options like "Near Source", "Seismic Fortification", "Site Class", "Earthquake Effect", "Max. Effect Coefficient", "Design Characteristic", "Damping", and "Max Period" are also visible.
- Middle Screenshot:** The "Add/Modify Artificial Earthquake" dialog box. It shows the "Function Name" as "P100-1(2013) H-ELASTIC". The "Data Type" is set to "Normalized Accel.". The "Graph Options" include "X-axis log scale" and "Y-axis log scale". The "Envelope Function" section includes "Rise Time" (1 sec), "Level Time" (2 sec), and "Total Time" (3 sec). The "Generation Options" section includes "Max. Iterations" (1), "Damping Ratio" (0.02), and a "Random Seed" (1732259852). The "Graph Type" section includes "Spectrum Graph" and "Acceleration Graph". The "Scaling" section includes "Max. Accel. [g]" (0). The "Generate Acceleration" button is highlighted. The "Desc." field shows "P100-1(2013) H-ELA: Tb=0.14, Tc=0.70, Td=". The "Data Export", "OK", "Cancel", and "Apply" buttons are at the bottom.
- Right Screenshot:** The "ke" dialog box. It shows the "Data Type" as "Normalized Accel.". The "Graph Options" include "X-axis log scale" and "Y-axis log scale". The "Acceleration Data" section includes "Max. Accel. [g]" (0). The "Desc." field shows "P100-1(2013) H-ELA: Tb=0.14, Tc=0.70, Td=". The "Data Export", "OK", "Cancel", and "Apply" buttons are at the bottom.

10. Addition of Element Stiffness Scale Factor

- Apply scale factors to the cross-sectional linear elements (Truss, Tension-only, Compression-only, Cable, Gap, Hook & Beam Elements). Specific stiffness may be reduced such as the case where the flexural stiffness of girders in the negative moment region may require reduction to reflect cracked sections of concrete.

■ Properties > Section Manager > Element Stiffness Scale Factor



Element Stiffness Scale Factor

11. RC Design for 1D Beam & Column, Plate Beam & Column as per BS 5400

- Design and checking of RC frame elements to BS 5400 are newly introduced in midas.
- This feature can be applied to piers or RC beams.

- **Design > RC Design > RC Code Design > Beam/Column Design**

BS 5400-4:1990 RC-Beam Design Result Dialog

Code: BS 5400-4:1990

Unit: N · mm

Primary Sorting Option

Sorted by

Member

Section

Negative Moment

Positive Moment

Shear Force

MEMB	SECT	SEL	Bc	Hc	f _{cu}	fy	POS	CHK	N(-) M	LCB	x/d	AsTop	P(+) M	LCB	x/d	AsBot	v	LCB	Asw	Stirrups	
Span			bf	hf	fy																
1	Beam	40 000	I	OK	3.2E+08	1	OK	1.046	1454.4	0.00000	1+ 0.033	324.32	2.10109	1+ 0.033	324.32	2.10109	1+ 0.033	1.3185	2.0-P10 @		
1	400.0 600.0	500.0	M	OK	2.6E+08	1	OK	0.119	711.6	0.00000	1+ 0.033	324.32	1.99919	1+ 0.033	324.32	1.99919	1+ 0.033	1.3185	2.0-P10 @		
600.0	0.000 0.000	500.0	J	OK	1.6E+08	1	OK	0.072	714.16	2.6E+07	1+ 0.033	324.32	1.84195	1+ 0.033	324.32	1.84195	1+ 0.033	1.3185	2.0-P10 @		
4	Beam	40 000	I	OK	1.2E+08	1	OK	0.052	515.25	6.2E+07	1+ 0.033	324.32	1.78849	1+ 0.033	324.32	1.78849	1+ 0.033	1.3185	2.0-P10 @		
1	400.0 600.0	500.0	M	OK	7.8E+07	1	OK	0.034	338.98	1.3E+08	1+ 0.059	582.50	1.68427	1+ 0.059	582.50	1.68427	1+ 0.059	1.3185	2.0-P10 @		
600.0	0.000 0.000	500.0	J	OK	1.1E+07	1	OK	0.033	324.32	1.7E+08	1+ 0.076	755.35	1.52649	1+ 0.076	755.35	1.52649	1+ 0.076	1.3185	2.0-P10 @		
5	Beam	40 000	I	OK	0.00000	1+ 0.033	324.32	1.9E+08	1+ 0.087	862.47	1.47462	1+ 0.033	324.32	1.47462	1+ 0.033	324.32	1.47462	1+ 0.033	1.3185	2.0-P10 @	
1	400.0 600.0	500.0	M	OK	0.00000	1+ 0.033	324.32	2.4E+08	1+ 0.111	1099.9	1.36893	1+ 0.033	324.32	1.36893	1+ 0.033	324.32	1.36893	1+ 0.033	1.3185	2.0-P10 @	
600.0	0.000 0.000	500.0	J	OK	0.00000	1+ 0.033	324.32	2.7E+08	1+ 0.124	1229.9	1.21194	1+ 0.033	324.32	1.21194	1+ 0.033	324.32	1.21194	1+ 0.033	1.3185	2.0-P10 @	
6	Beam	40 000	I	OK	0.00000	1+ 0.033	324.32	2.8E+08	1+ 0.129	1284.7	1.16201	1+ 0.033	324.32	1.16201	1+ 0.033	324.32	1.16201	1+ 0.033	1.3185	2.0-P10 @	
1	400.0 600.0	500.0	M	OK	0.00000	1+ 0.033	324.32	3.2E+08	1+ 0.148	1468.6	1.05584	1+ 0.033	324.32	1.05584	1+ 0.033	324.32	1.05584	1+ 0.033	1.3185	2.0-P10 @	
600.0	0.000 0.000	500.0	J	OK	0.00000	1+ 0.033	324.32	3.4E+08	1+ 0.158	1572.8	0.90097	1+ 0.033	324.32	0.90097	1+ 0.033	324.32	0.90097	1+ 0.033	1.3185	2.0-P10 @	
7	Beam	40 000	I	OK	0.00000																

BS 5400-4:1990 RC-Beam Checking Result Dialog

Code: BS 5400-4:1990

Unit: N · mm

Primary Sorting Option

Sorted by

Member

Section

Results

Strength

Serviceability

Stress Check

Crack Control

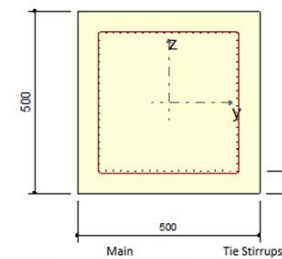
Deflection

MEMB	SECT	SEL	Bc	Hc	f _{cu}	fy	POS	CHK	Concrete				Reinforcement				Crack Control			Deflection Control	
Span			bf	hf	fy				Top-s	Top-s	Bot-s	Bot-s	Top-s	Top-s	Bot-s	Bot-s	Top-w	Top-w	Bot-w	Def	Delta

3) Material
Concrete
 $f_{cu} = 50.000\text{MPa}$, $E_c = 34.000.000\text{MPa}$
Reinforcement
 $f_y = 500.000\text{MPa}$, $f_{yk} = 500.000\text{MPa}$, $E_s = 200.000.000\text{MPa}$

4) Length
 $L = 3.000\text{m}$

5) Reinforcement Data

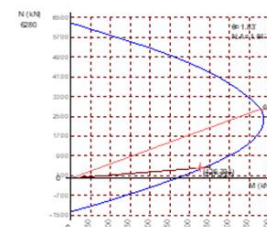


2. Axial and moment capacity (End, 1.00L)

Axial and moment	LCB	cLCB1+MY	
	N / N_u	417.334kN / 425.555kN = 0.981	OK
	M_y / M_{uy}	326.609kN-m / 334.053kN-m = 0.978	OK
	M_z / M_{uz}	10.433kN-m / 10.671kN-m = 0.978	OK
	M / M_u	326.775kN-m / 334.224kN-m = 0.978	OK
	$\rho_{min} \leq \rho \leq \rho_{max}$	$\rho_{min} = 0.01000 \leq \rho = 0.01234 \leq \rho_{max} = 0.06000$	OK

^a cLCB1+MY: ULS Comb 1: 1.265D+1.925DW+1.65MI 1.17

1) PM Interaction curve



N_x (kN)	M_x (kN-m)
6,279.993	0.0
5,283.093	196.2
4,657.899	299.9
4,056.509	376.6
3,514.092	429.9
3,064.424	463.3
2,804.477	479.8
2,541.871	485.5
2,064.719	483.3
1,448.480	452.2
665.294	369.3
-353.285	203.3
-1,341.712	0.0

Design Result Table

Detailed Calculation Report

12. RC Design for 1D Beam & Column, Plate Beam & Column as per BS 5400

- Design and checking of RC plate elements to BS 5400 are newly introduced in midas.
- This feature can be applied to culvert, pier walls or slabs where the stresses are distributed in one way.

Design > RC Design > RC Code Design > Plate Beam/Column Design

Plate Beam Design Result Dialog

Code : BS 5400-4:1990 Unit : kN, m / m

Sub-Domain	SEL	Major Dir	CHK	Pos	Req_As	Elem.	Node	LCB_M	M	M_u	Ratio_M	Elem.	Node	LCB_V	v
TC	☐	Dir1	OK	Pos	0.0020	521	567	2	117.005	117.096	0.9992	541	609	2	817.429
				Neg	0.0003	541	608	2	0.00000	18.9725	0.0000				
TE	☐	Dir1	OK	Pos	0.0014	461	525	2	86.8913	86.7653	0.9991	441	504	2	1480.82
				Neg	0.0022	421	3	2	125.078	125.169	0.9993				
BC	☐	Dir1	OK	Pos	0.0003	740	797	2	0.00000	25.8236	0.0000	740	798	2	611.203
				Neg	0.0016	700	756	2	117.729	117.829	0.9991				
BE	☐	Dir1	OK	Pos	0.0019	620	1	2	137.500	137.613	0.9992	620	672	2	1591.02
				Neg	0.0012	660	714	2	93.1388	93.2218	0.9991				

Connect Mod

Select All

Detail...

Graphic...

Close

Plate Beam/Column Design Result Table

Preview Window

Name: TC(Dir1) Print Print All Close Save

1. Design Condition

Design Type : Plate Beam (1D)
Sub-Domain : TC
Design Code : BS 5400-4:1990
Unit System : kN, m / m
Material Data : fcu = 24000, fy = 460000, fyt = 250000 KPa
Thickness : 0.23 m

2. Section Diagram

Element No : 521

Rebar Pattern Top Required Rebar Area = 0.00027 m²/m
Bot Required Rebar Area = 0.00199277 m²/m
Required Stirrups Spacing : 2.0-P13 @0.040

3. Bending Moment Capacity

	Top(Negative)	Bottom(Positive)
Mu	0.00	117.01
Element No.	541	521
Load Combination	cLCB2	cLCB2
Mr	18.97	117.10
Check Ratio (Mu/Mr)	0.0000	0.9992

4. Shear Capacity

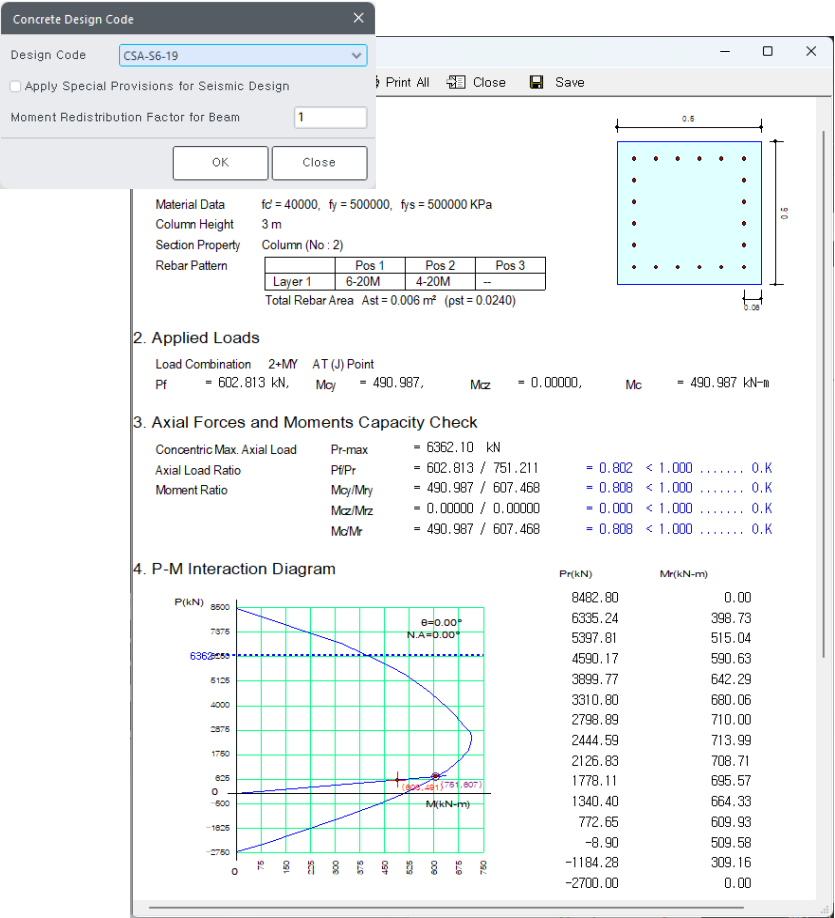
Element No. 541
Load Combination cLCB2
Applied Shear Resistance v = 817.429
Shear Strength (Out of plane) v_uc = 896.654 v_ur = 1441.67
Required Stirrups Spacing 0.04004 m
Shear Ratio vlv_u = 817.429 / 2338.32 = 0.350 < 1.000 0.K

Plate Beam Design Summary

13. RC & Steel Design as per CSA S6:19

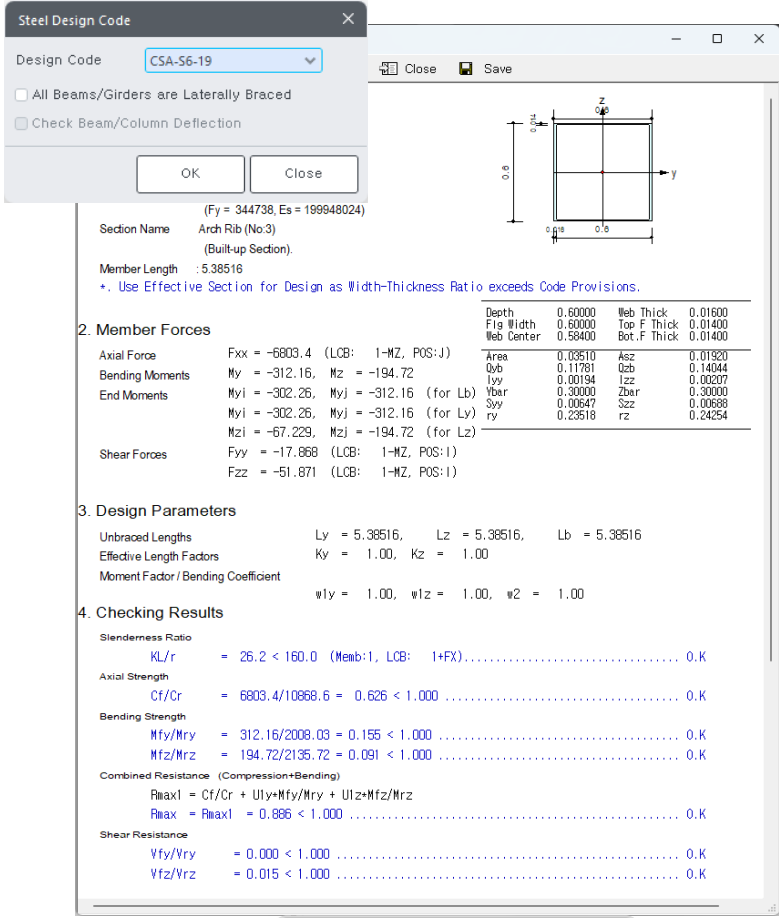
- RC member design and steel member design have been updated as per CSA S6: 19.

Design > RC Design > Design Code Option



RC Design Summary Report

Design > Steel Design > Design Code Option



Steel Design Summary Report

14. Response Modification Factor by members and components as per AASHTO LRFD

- Seismic design force effects for substructures shall be determined by dividing the force effects resulting from elastic analysis by the appropriate response modification factor, R.
- In the previous version, only a single response modification factor could be applied. However, the current version allows for the application of response modification factors based on substructure types and load components.
- Applicable Code: AASHTO-LRFD

Design > RC Design > Design Parameters > Response Modification Factor (R)

Tree MenuTask Pane

GeneralSteelConcreteSRC

Response Modification Factor

Option

Add/Replace

Delete

Response Modification Factor

Fx

1

Fy

1

Fz

1

Mx

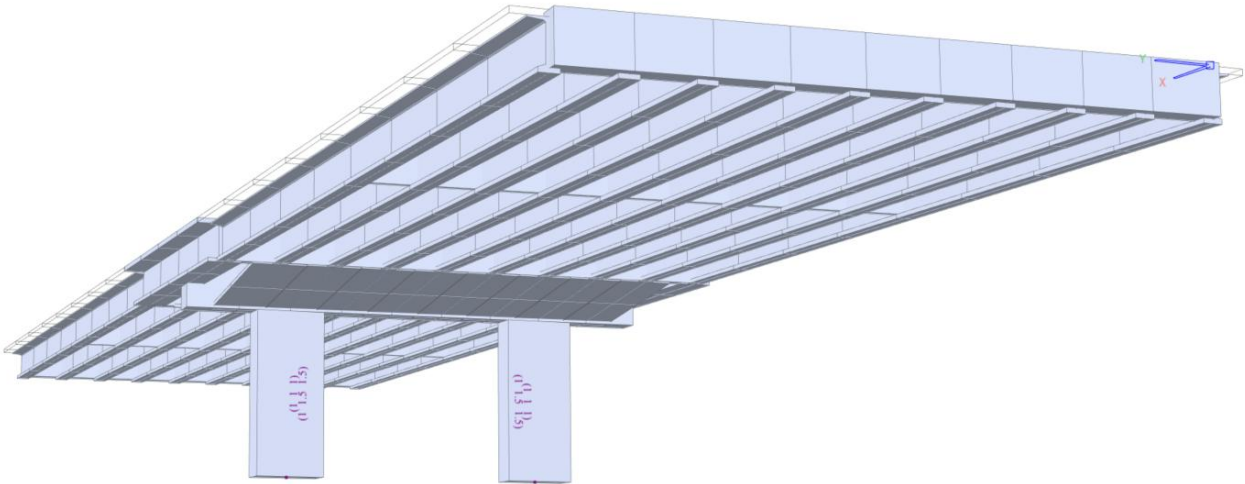
1

My

1.5

Mz

1.5



Start Page	MIDAS CIVIL NX	Response Modification Factor (R)				
Elem	R factor for Fx	R factor for Fy	R factor for Fz	R factor for Mx	R factor for My	R factor for Mz
390	1.00	1.00	1.00	1.00	1.50	1.50
391	1.00	1.00	1.00	1.00	1.50	1.50
*						

Response Spectrum Modification Factor Dialog

Response Spectrum Modification Factor Table

15. Addition of an option “Long-term Section Property of Cracked Composite Section: Rebar Area/3” as per AASHTO LRFD

- In previous versions, the long-term section properties of the composite girder subjected to negative moment were calculated as "Steel Section + Long. Reinforcement/3".
- Now, an option is added to determine the section properties as "Steel Section + Long. Reinforcement".

Design > Composite Design > Design Code Option

Composite Steel Girder Design Code

Code: AASHTO-LRFD20 Update by Code

Strength Resistance Factor

Resistance factor for yielding (Phi_y)

0.95

Resistance factor for fracture (Phi_u)

0.8

Resistance factor for axial comp. (Phi_c)

0.9

Resistance factor for flexure (Phi_f)

1

Resistance factor for shear (Phi_v)

1

Resistance factor for shear connector (Phi_sc)

0.85

Resistance factor for bearing (Phi_b)

1

Girder Type for Box/Tub Section

Single Box Sections

Multiple Box Sections

Consider St.Venant Torsion and Distortion Stresses

Option For Strength Limit State

Appendix A6 for Negative Flexure Resistance in Web Compact / NonCompact Sections

Mn <= 1.3RhMy in Positive Flexure and Compact Sections(6.10.7.1.2-3)

Post-buckling Tension-field Action for Shear Resistance(6.10.9.3.2)

Long-term Section Property of Cracked Composite Section: Rebar Area/3

Include Normal Stress due to Torsional Warping

Design Parameters

Strength Limit State-Flexure

Strength Limit State-Shear

Service Limit State

Constructibility

Fatigue Limit State

Shear Connectors, Longitudinal Stiffeners, Bearing Stiffener

OK

Cancel

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
121																													
122																													
123																													
124																													
125																													
126																													
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Design Report

Composite Steel Girder Design Code Option

Updates in CIVIL NX 2025 (v1.1)

Release Date : Jan. 2025

Product Ver. : CIVIL NX 2025 (v1.1)

Please note that the following features are exclusively available in MIDAS CIVIL NX. Common updates included in CIVIL 2025 (v1.1) are not detailed in the following document.



DESIGN OF CIVIL STRUCTURES

Integrated Solution System for Bridge and Civil Engineering

- midas GSD now supports the verification of prestressed concrete sections through P-M interaction curves, Moment-Curvature curves, and Ultimate Limit State (ULS) verification, ensuring comprehensive design validation.
- midas GSD now allows the definition of multiple materials to support the rehabilitation of cross-sections, providing enhanced flexibility and functionality for structural design and analysis.
- This feature is exclusively available in MIDAS CIVIL NX.

midas GSD

16. Enhancements in midas GSD

- Tendon Material DB: ASTM, Eurocode, AS/N 4672.1
- Nonlinear Material Properties: Elastic, Bilinear, Trilinear, User-defined

Apps > General Section Designer

Tendon Material Property

Name

Tendon

Material Code

ASTM(S)

DB

None

Tensile Strength

EN05(S)

Yield Strength

EN05-PS(S)

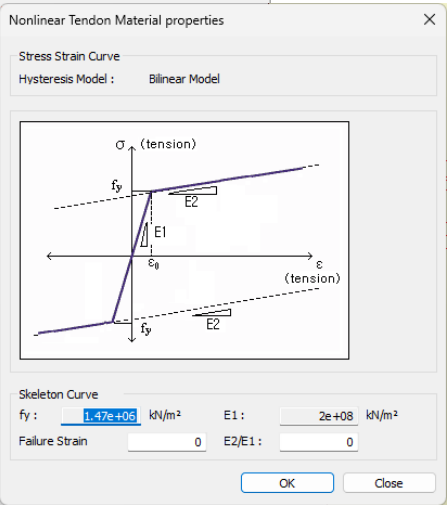
Modulus of Elasticity

AS/NZS 4672.1(S)

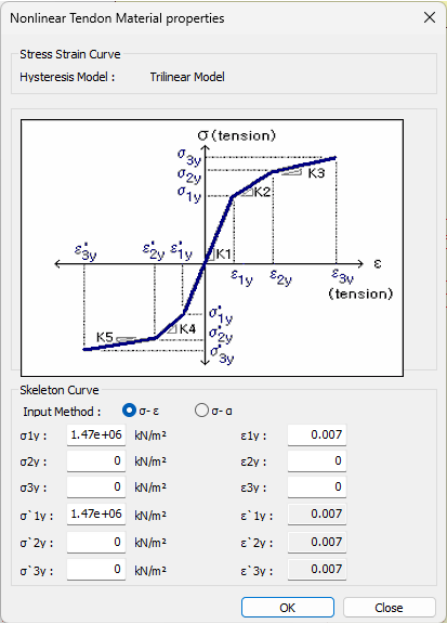
Stress Strain Curve

Bilinear

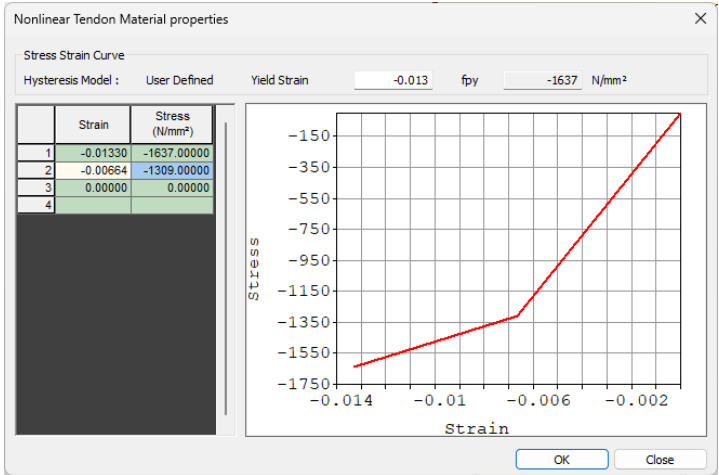
Tendon Material Property



Bilinear Model



Trilinear Model



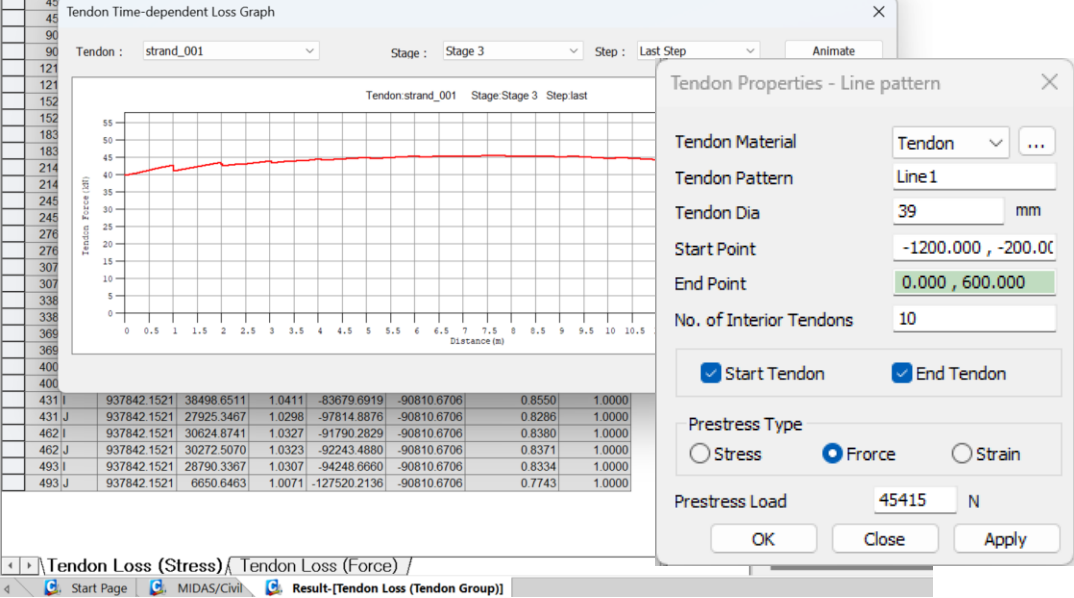
User-defined Model

16. Enhancements in midas GSD

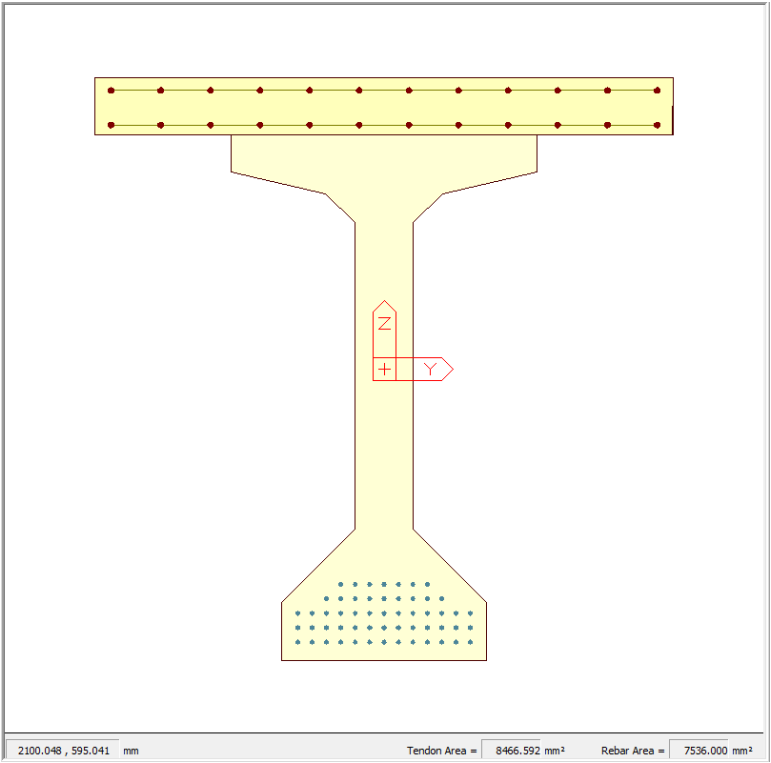
- Tendon coordinates import/export from midas CIVIL
- Effective force is imported into midas GSD.

Apps > General Section Designer

Elem	Part	Stress (After Immediate Loss)	Elastic Deform. Loss R	Stress(Elastic Loss) Stress(Elm)	Creep/Shrinkage Loss (μm^2)	Relaxation Loss (N/mm^2)	Stress(After All Loss) Stress(After Imme)	Effective Num.
The Loss of tendon group (strand_001) at the stage of [Stage 3]								
Tendon Group		strand_001	Stage 3	Apply				
13	J	937842.1521	6617.7573	1.0071	-127609.5551	-90810.6706	0.7742	1.0000
13	J	937842.1521	28796.5622	1.0307	-94239.4197	-90810.6706	0.8334	1.0000
29	J	937842.1521	30274.4762	1.0323	-92235.5207	-90810.6706	0.8371	1.0000
29	J	937842.1521	30626.7082	1.0327	-91782.2639	-90810.6706	0.8380	1.0000



Import Tendon from midas Civil



Tendon area

17. Eurocode 22 National Annexes for RC and PSC Design

- The program supports national annexes for RC design and PSC design for the following 22 countries: Austria, Belgium, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Romania, Singapore, Slovakia, Slovenia, Spain, Sweden, UK
- This feature is exclusively available in MIDAS CIVIL NX.

- **Design > RC Design > Design Code Option**
- **Design > PSC Design > Design Code Option**

Concrete Design Code

Design Code

Eurocode2-2:05

National Annex

Recommended

Moment Resistance

Moment Redistribution

Beam Checking

☒ Singly Reinforced

☐ Doubly Reinforced

Column Design

☒ Axial load plus bending

☐ Axial load plus shear

☐ Consider Axial-H

Shear Resistance

Strut Angle for S

Recommended

Austria

Belgium

Cyprus

Czech Republic

Denmark

Finland

France

Germany

Greece

Ireland

Italy

Luxembourg

Netherlands

Norway

Poland

Romania

Singapore

Slovakia

Slovenia

Spain

Sweden

UK

OK

Close

Concrete Design Code

PSC Design Code

Design Code

Eurocode2-2:05

National Annex

Recommended

Input Parameters

Ultimate limit states

Moment resistance

☒ Consider tendons in tensile zone

☐ Consider all tendons

Shear resistance

Strut angle

45

(Degree)

Prestressing steel type

☒ Smooth bars and wires

☐ Strands

☐ Indented wires

☐ Ribbed bars

☐ User input data

Modify design

Serviceability limit states

Crack control

Cement class

Class R (s=0.20)

Output parameters

Ultimate limit states

☒ Ultimate bending resistance

☒ Shear resistance

☒ Torsional resistance

Serviceability limit states

☒ Stress for cross section at a construction stage

☒ Stress for cross section at service loads

☒ Principal stress at a construction stage

☒ Principal stress at service loads

☒ Tensile stress for prestressing steel

☒ Crack control

Select All

Unselect All

OK

Cancel

PSC Design Code

17. Eurocode 22 National Annexes for RC and PSC Design

	Recomm.	Austria	Belgium	Cyprus	Czech	Denmark	Netherland	Finland	France	German	Greece	Ireland	Italy	Luxemburg	Norway	Poland	Romania	Singapore	Slovakia	Slovenia	Spain	Sweden	UK
fck(min)	30	25	25	30	20	unlimited	30	25	20	20(R) 30(P)	25(R) 30(P)	25	25	unlimited	30	30	16	30	30	30	25	25	25
fck(max)	70	60	90	70	90	50	70	unlimited	90	50	50	unlimited	60	90	60	70	50 70 (shear) 70 (other)		70	70	90	100	50 (shear) 70 (other)
fykmax (MPa)	600	600	500	600	600	600	600	700	500	500	500	500	450	600	600	600	500	600	600	600	500	600	600
phimin (mm)	8	12	12	8	12	8	8	8	8	12	8	12	12	8	10	6	12	12	10	12	12	8	12
Alphacc	0.85	0.85	0.85	0.85	0.9	1	1	0.85	1	0.85	0.85	0.85	0.85	0.85(bend) 1.00(other)	0.85	0.85	0.85(90% ↑) 1.0(50%↓)	0.85	0.85	0.85	1	1	0.85(comp) 1.00(other)
Alphact	1	1	1	1	1	1	1	1	1	0.85	1	1	1	1	0.85	1	1	1	1	1	1	1	1
Alphacw	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	1 (RC) 1 + σcp/fct m (PSC)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	(1 + σcp/fcd) or 1.25 or 2.5 (1 - σcp /fcd)	
CRdc	0.18/yc	0.18/yc	1.25-0.18/ yc	0.18/yc	0.18/yc	0.18/yc	0.12 (persi stent or tr ansient) 0.15 (acci dental)	0.18/yc	0.18/yc	0.15/yc	0.18/yc	0.18/yc	0.18/yc	0.18/yc	0.15/ yc (dg < 16) 0.18/yc (dg >= 16)	0.18/yc	0.18/yc	0.18/yc	0.18/yc	0.18/yc	0.18/yc	0.18/yc	0.18/yc
Rhowmin	0.08sqrt(fck) /fyk	0.15fctm/fy d	0.08sqrt(fck) /fywk	0.08sqrt(fck) /fyk	0.08sqrt(fck) /fyk	0.063 sqrt(f ck) /fyk	0.08sqrt(fck) /fyk	0.08sqrt(fck) /fyk	0.08sqrt(fck) /fyk	0.256-fctm/f yd (pre) 0.16-fctm/fy d (other)	0.08sqrt(fck) /fyk	0.08sqrt(fck) /fyk	0.08sqrt(fck) /fyk	0.08sqrt(fck) /fyk	(0.1-√fck) /fyk	0.08sqrt(fck) /fyk	0.08sqrt(fck) /fyk	0.08sqrt(fck) /fyk	0.08sqrt(fck) /fyk	0.08sqrt(fck) /fyk	fctm (7.5-fyk)	0.08sqrt(fck) /fyk	0.08sqrt(fck) /fyk
Beam Rhomin	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)	Rhowmin (9.2.2(5))	아래 그림 참고	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)	unlimited	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)	Separate table	min(0.26 fct m/dfy, 0.0013)	min(0.26 fct m/dfy, 0.0013)
Beam Rhomax	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	unlimited	0.04
Beam Slmax	0.75d(1 + c ota)	0.75d(1 + c ota) <= 250mm	0.75d(1 + c ota)	0.75d(1 + c ota)	400	0.75d(1 + c ota)	300	0.75d(1 + c ota)	0.75 d (1 + cot α) (h > 250mm) 0.90d (h ≤ 250m m)	Separate table	0.75d(1 + c ota)	0.75d(1 + c ota)	0.75d(1 + c ota)	0.75d(1 + c ota)	0.60 · h' · (1 + cot α)	0.75d(1 + c ota)	0.75d(1 + c ota)	0.75d(1 + c ota)	400	0.75d(1 + c ota)	Separate table	0.75d(1 + c ota)	0.75d(1 + c ota)
Column Rhomin	max(0.1NE d/fyd/Ag, 0. 002)	0.13NEd/fy d/Ag, 0. ≥ 0.0026	max(0.1NE d/fyd/Ag, 0. 002)	max(0.1NE d/fyd/Ag, 0. 002)	max(0.1NE d/fyd/Ag, 0. 002)	max(0.1NE d/fyd/Ag, 0. 002)	max(0.1NE d/fyd/Ag, 0. 002)	max(0.1NE d/fyd/Ag, 0. 002)	max(0.1NE d/fyd/Ag, 0. 002)	max(0.15 NEd/fyd/Ag , 0.003)	max(0.1NE d/fyd/Ag, 0. 002)	max(0.1NE d/fyd/Ag, 0. 002)	max(0.1NE d/fyd/Ag, 0. 003)	max(0.1NE d/fyd/Ag, 0. 002)	0.2 fcd/fyd ≤ 0.5NEd/fy d/Ag ≤ 0.01	max(0.1NE d/fyd/Ag, 0. 002)	max(0.1NE d/fyd/Ag, 0. 004)	max(0.1NE d/fyd/Ag, 0. 002)	max(0.1NE d/fyd/Ag, 0. 002)	max(0.1NE d/fyd/Ag, 0. 003)	max(0.1NE d/fyd/Ag, 0. 004/fyd)	max(0.1NE d/fyd/Ag, 0. 002)	max(0.1NE d/fyd/Ag, 0. 002)
Column Scltmax	min(20*dia, dim, 400m m)	min(12φ, b min, 250m m)	min(15φ, b min, 300m m)	min(20*dia, dim, 400m m)	min(15φ, b min, 300m m)	min(20*dia, dim, 400m m)	min(20*dia, dim, 400m m)	min(15φ, b min, 400 mm)	min(20*dia, dim, 400m m)	min(12φ, b min, 300m m)	min(20*dia, dim, 400m m)	min(20*dia, dim, 400m m)	min(12*dia, dim, 250m m)	min(15φ, b min, 300m m)	min(15φ, b min, 400 mm)	min(20*dia, dim, 400m m)	min(15φ, b min, 300m m)	min(20*dia, dim, 400m m)	min(15φ, b min, 300m m)	min(12φ, b min, 300m m)	min(15φ, b min, 300m m)	min(20*dia, dim, 400m m)	min(20*dia, dim, 400m m)

17. Eurocode 22 National Annexes for RC and PSC Design

Crack Width by Exposure Classes

Recommended

Table 7.1N Recommended values of w_{max} (mm)

Exposure Class	Reinforced members and prestressed members with unbonded tendons	Prestressed members with bonded tendons
	Quasi-permanent load combination	Frequent load combination
X0, XC1	0,4 ¹	0,2
XC2, XC3, XC4	0,3	0,2 ²
^(AC2) XD1, XD2, XD3, XS1, XS2, XS3 ^(AC3)		Decompression
Note 1: For X0, XC1 exposure classes, crack width has no influence on durability and ^(AC2) this limit is set to give generally acceptable appearance. In the absence ^(AC3) of appearance conditions this limit may be relaxed.		
Note 2: For these exposure classes, in addition, decompression should be checked under the quasi-permanent combination of loads.		

Austria

7.3.1 (105)	When choosing the "Austrian ÖNORM-EN NA method" the values of maximal calculated crack width are given in the National Annex: Maximal crack width table [mm] <table><tr><th>Exposure class</th><th>RM (Quasi)</th><th>RM (Freq)</th><th>POST (Freq)</th><th>POST (Quasi)</th><th>POST (Char)</th><th>PRE (Freq)</th><th>PRE (Quasi)</th><th>PRE (Char)</th></tr><tr><td>X0, XC1</td><td>0.3</td><td>-</td><td>0.2</td><td>-</td><td>-</td><td>0.2</td><td>-</td><td>-</td></tr><tr><td>XC2, XC3, XC4, XD1, XS1</td><td>0.3</td><td>-</td><td>0.2</td><td>-</td><td>-</td><td>-</td><td>-</td><td>0.2</td></tr><tr><td>XD2, XS2</td><td>0.3</td><td>-</td><td>-</td><td>-</td><td>0.2</td><td>-</td><td>-</td><td>0.2</td></tr></table>								Exposure class	RM (Quasi)	RM (Freq)	POST (Freq)	POST (Quasi)	POST (Char)	PRE (Freq)	PRE (Quasi)	PRE (Char)	X0, XC1	0.3	-	0.2	-	-	0.2	-	-	XC2, XC3, XC4, XD1, XS1	0.3	-	0.2	-	-	-	-	0.2	XD2, XS2	0.3	-	-	-	0.2	-	-	0.2
Exposure class	RM (Quasi)	RM (Freq)	POST (Freq)	POST (Quasi)	POST (Char)	PRE (Freq)	PRE (Quasi)	PRE (Char)																																				
X0, XC1	0.3	-	0.2	-	-	0.2	-	-																																				
XC2, XC3, XC4, XD1, XS1	0.3	-	0.2	-	-	-	-	0.2																																				
XD2, XS2	0.3	-	-	-	0.2	-	-	0.2																																				

Belgium

Tableau 7.101N-ANB – Valeurs recommandées de w_{max} [mm].

Type d'éléments	Eléments en béton armé ou en béton précontraint sans armatures de précontrainte adhérente	Eléments en béton précontraint à armatures adhérentes
Superstructure de pont route	0,2	Aucune décompression
Superstructure de pont-rails	0,3	Aucune décompression
Autres superstructures	0,2	Aucune décompression
Infrastructures (piles et culées)	0,3	0,2
Soutènements de terres	0,2	0,2
Ancrages de réactions	0,3	Aucune décompression

Czech

Maximal crack width table [mm]

Exposure class	RM (Quasi)	PRE (Freq)	PRE (Char)	POST-PL1 (Freq)	POST-PL2+3 (Freq)
X0, XC1	0.4	0.2	0	0.2	0.3
XC2, XC3, XC4, XD1, XS1	0.3	0.1	0	0.2	0.3
XD2, XD3, XS2, XS3	0.2	-	0.2	0.1	0.2

Denmark

Table 7.1 NA - Recommended maximum values of calculated crack widths w_{max} (mm)

Environmental class	Non-prestressed reinforcement	Prestressing tendons
Extra aggressive	0,2 mm	0,1 mm
Aggressive	0,3 mm	0,2 mm
Moderate	0,4 mm	0,3 mm

17. Eurocode 22 National Annexes for RC and PSC Design

Design > RC Design > Design Code Option

Recommended	Luxembourg	Sweden	Germany	Czech
Concrete Design Code Design CodeEurocode2-2:05 National AnnexRecommended Moment Resistance Moment Redistribution Factor for Beam1 Beam Checking Singly Reinforced Beam Doubly Reinforced Beam Column Design Axial load plus biaxial bending(Fx+My+Mz) Axial load plus uniaxial bending(Fx+My) Consider Axial-Moment Interaction for Plate Column Shear Resistance Strut Angle for Shear Resistance45Deg OK Close	Concrete Design Code Design CodeEurocode2-2:05 National AnnexLuxembourg Moment Resistance Moment Redistribution Factor for Beam1 Beam Checking Singly Reinforced Beam Doubly Reinforced Beam Column Design Axial load plus biaxial bending(Fx+My+Mz) Axial load plus uniaxial bending(Fx+My) Consider Axial-Moment Interaction for Plate Column Shear Resistance Strut Angle for Shear Resistance45Deg Crack Control Structure Type :Road superstructure OK Close	Concrete Design Code Design CodeEurocode2-2:05 National AnnexSweden Moment Resistance Moment Redistribution Factor for Beam1 Beam Checking Singly Reinforced Beam Doubly Reinforced Beam Column Design Axial load plus biaxial bending(Fx+My+Mz) Axial load plus uniaxial bending(Fx+My) Consider Axial-Moment Interaction for Plate Column Shear Resistance Strut Angle for Shear Resistance45Deg Crack Control Service Life :L100 OK Close	Concrete Design Code Design CodeEurocode2-2:05 National AnnexGermany Moment Resistance Moment Redistribution Factor for Beam1 Beam Checking Singly Reinforced Beam Doubly Reinforced Beam Column Design Axial load plus biaxial bending(Fx+My+Mz) Axial load plus uniaxial bending(Fx+My) Consider Axial-Moment Interaction for Plate Column Shear Resistance Strut Angle for Shear Resistance45Deg Crack Control Bridge Type :Railroad OK Close	Concrete Design Code Design CodeEurocode2-2:05 National AnnexCzech Republic Moment Resistance Moment Redistribution Factor for Beam1 Beam Checking Singly Reinforced Beam Doubly Reinforced Beam Column Design Axial load plus biaxial bending(Fx+My+Mz) Axial load plus uniaxial bending(Fx+My) Consider Axial-Moment Interaction for Plate Column Shear Resistance Strut Angle for Shear Resistance45Deg Crack Control Protection Level :1 OK Close

17. Eurocode 22 National Annexes for RC and PSC Design

Design > PSC Design > Design Code Option

Design CodeEurocode2-2:05National AnnexRecommended

Input Parameters

Ultimate limit states

Moment resistance

Consider tendons in tensile zone

Consider all tendons

Shear resistance

Strut angle45(Degree)

Serviceability limit state

Crack control

Cement class

Class R (s=0.20)

Strut angle45(Degree)

Prestressing steel type

Smooth bars and wires

Strands

Indented wires

Ribbed bars

User input data

Modify design parameters...

Output parameters

Ultimate limit states

Ultimate bending resistance

Shear resistance

Torsional resistance

Serviceability limit states

Stress for cross section at a construction stage

Stress for cross section at service loads

Principal stress at a construction stage

Principal stress at service loads

Tensile stress for prestressing steel

Crack control

Select All

Unselect All

OK

Cancel

Design CodeEurocode2-2:05National AnnexSweden

Input Parameters

Ultimate limit states

Moment resistance

Consider tendons in tensile zone

Consider all tendons

Shear resistance

Strut angle45(Degree)

Serviceability limit state

Crack control

Cement class

Class R (s=0.20)

Service LifeL100

Strut angle45(Degree)

Prestressing steel type

Smooth bars and wires

Strands

Indented wires

Ribbed bars

User input data

Modify design parameters...

Output parameters

Ultimate limit states

Ultimate bending resistance

Shear resistance

Torsional resistance

Serviceability limit states

Stress for cross section at a construction stage

Stress for cross section at service loads

Principal stress at a construction stage

Principal stress at service loads

Tensile stress for prestressing steel

Crack control

Select All

Unselect All

OK

Cancel

Design CodeEurocode2-2:05National AnnexCzech Republic

Input Parameters

Ultimate limit states

Moment resistance

Consider tendons in tensile zone

Consider all tendons

Shear resistance

Strut angle45(Degree)

Serviceability limit state

Crack control

Cement class

Class R (s=0.20)

Protection Level1

Strut angle45(Degree)

Prestressing steel type

Smooth bars and wires

Strands

Indented wires

Ribbed bars

User input data

Modify design parameters...

Output parameters

Ultimate limit states

Ultimate bending resistance

Shear resistance

Torsional resistance

Serviceability limit states

Stress for cross section at a construction stage

Stress for cross section at service loads

Principal stress at a construction stage

Principal stress at service loads

Tensile stress for prestressing steel

Crack control

Select All

Unselect All

OK

Cancel

Design CodeEurocode2-2:05National AnnexNorway

Input Parameters

Ultimate limit states

Moment resistance

Consider tendons in tensile zone

Consider all tendons

Shear resistance

Strut angle45(Degree)

Serviceability limit state

Crack control

Cement class

Class R (s=0.20)

Aggregate size0.016 m

Coefficient kc1

Strut angle45(Degree)

Prestressing steel type

Smooth bars and wires

Strands

Indented wires

Ribbed bars

User input data

Modify design parameters...

Output parameters

Ultimate limit states

Ultimate bending resistance

Shear resistance

Torsional resistance

Serviceability limit states

Stress for cross section at a construction stage

Stress for cross section at service loads

Principal stress at a construction stage

Principal stress at service loads

Tensile stress for prestressing steel

Crack control

Select All

Unselect All

OK

Cancel

Design CodeEurocode2-2:05National AnnexLuxembourg

Input Parameters

Ultimate limit states

Moment resistance

Consider tendons in tensile zone

Consider all tendons

Shear resistance

Strut angle45(Degree)

Serviceability limit state

Crack control

Cement class

Class R (s=0.20)

Structure TypeRoad superstructure

Strut angle45(Degree)

Prestressing steel type

Smooth bars and wires

Strands

Indented wires

Ribbed bars

User input data

Modify design parameters...

Output parameters

Ultimate limit states

Ultimate bending resistance

Shear resistance

Torsional resistance

Serviceability limit states

Stress for cross section at a construction stage

Stress for cross section at service loads

Principal stress at a construction stage

Principal stress at service loads

Tensile stress for prestressing steel

Crack control

Select All

Unselect All

OK

Cancel

Recommended

Sweden

Czech

Norway

Luxembourg

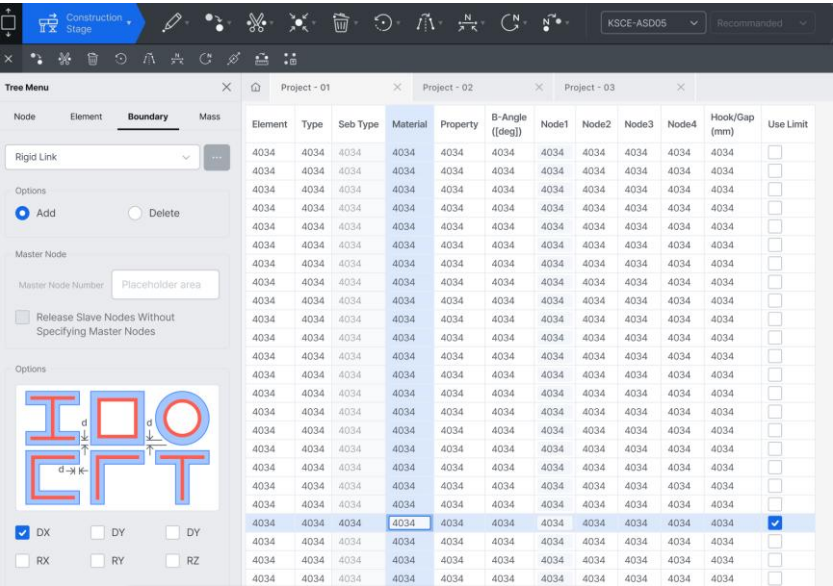
MIDAS

28 / 28

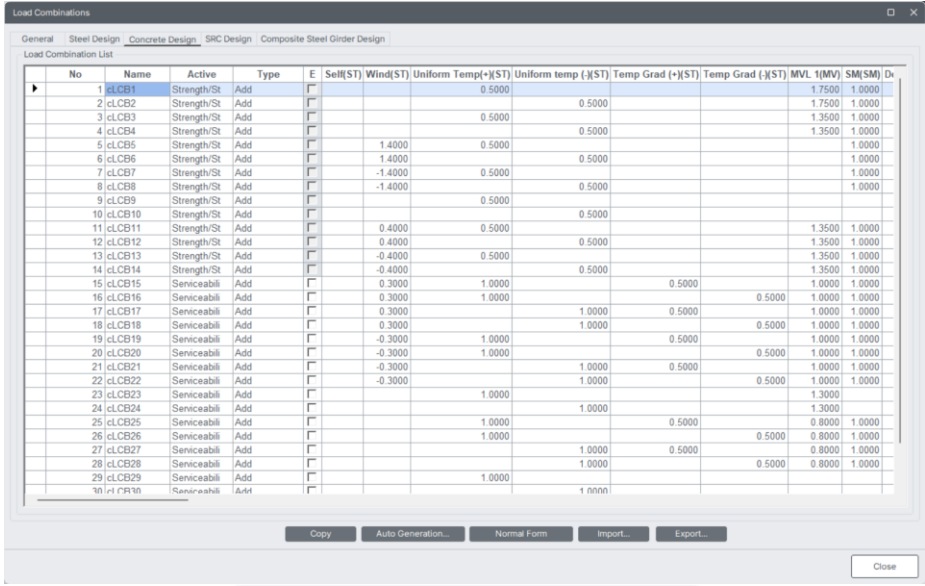
18. Enhancements in Output Table Performance and Visual Design

- In MIDAS Civil NX 2025, the output table processing time has been improved, achieving a reduction of approximately 30% compared to MIDAS Civil 2025.
- Additionally, the table color scheme has been updated to align with the new design framework of Civil NX, enhancing visual consistency and user experience.

Test model	Type of table	midas Civil (sec)	MIDAS CIVIL NX (sec)	Reduced rate(%)
Model 1	Plate forces/moments	198.81	133.95	-0.33
	Plane-Stress/Plate Stresses_Plate Force	19.92	12.93	-0.35
	Plane-Stress/Plate Stresses_Plate Stress	48.04	31.38	-0.35
Model 2	Beam Forces/Moments	12.76	8.31	-0.35
	Beam Forces/Moments_View by Max Value	1258.93	93.15	-0.93



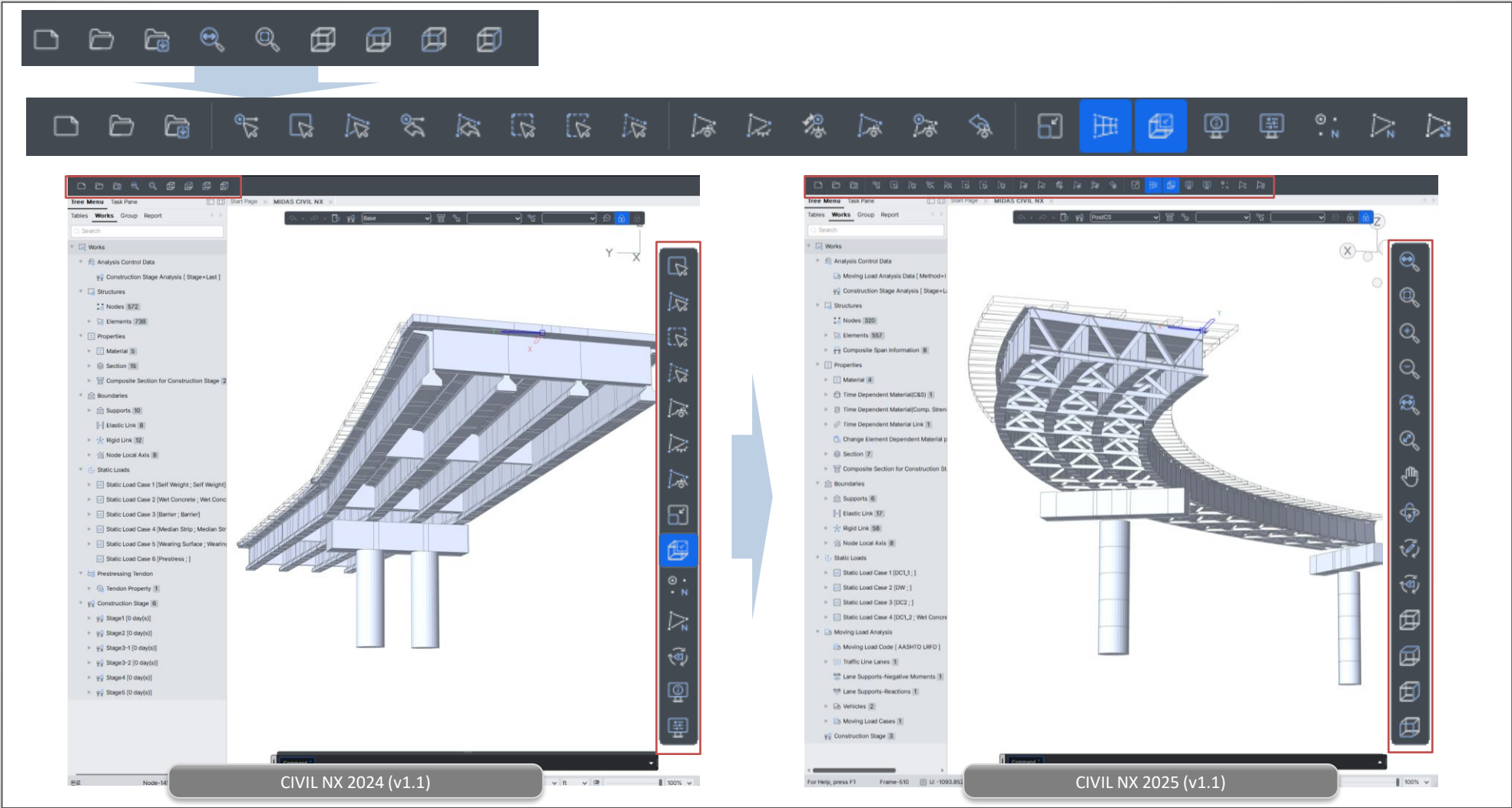
Section Properties Table



Load Combinations Dialog Box

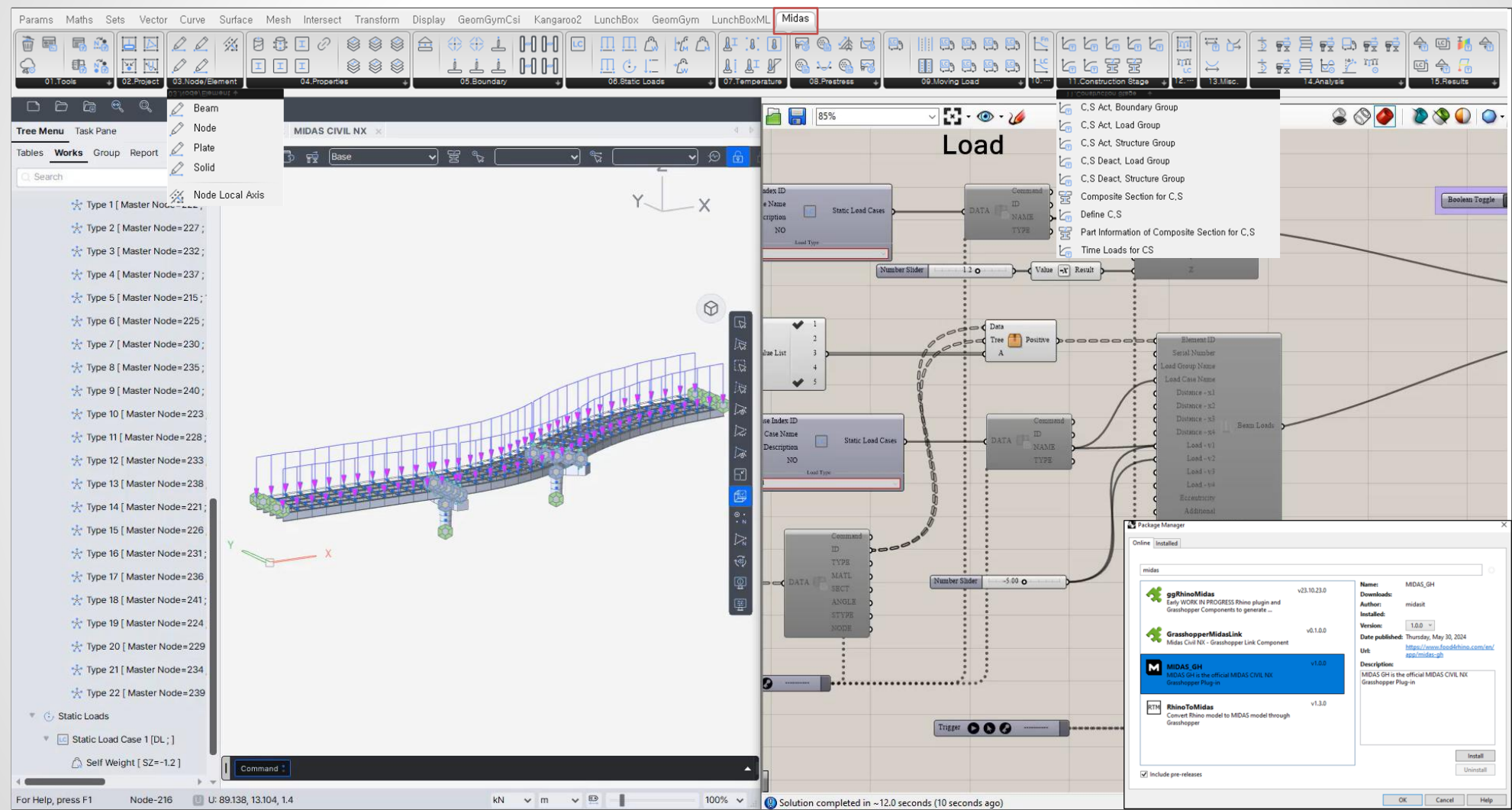
19. Updates to Default Settings of the Custom Toolbar

- The default icons in both the Custom Toolbar and the Vertical Toolbar have been updated to align with those used in the previous version of midas Civil, ensuring a consistent user experience.



20. Grasshopper Plug-in

- Users can connect their Rhino + Grasshopper structure models with MIDAS CIVIL NX using the complimentary MIDAS GH plug-in via Package Manager.
- The MIDAS GH provide from geometry components to moving load, Construction Stages, CIVIL NX material and section database, and more.



21. Excel Add-in with MCT

- The users can use their existing calculating sheets using MIDAS CONNECTOR. This Add-in parsing the data using APIs, and it is more flexible to create, modify, and delete components.
- Usage: 1. Select all components and connect to MCT_Parsing 2. Search Command 3. Give a name 4. Select a folder 5. Click add to Folder button, and 6. Press the All MXT Export button.

AutoSave On

Civil-Excel-Connector

Save

File

Home

Insert

Page Layout

Formulas

Data

Review

View

Automate

Help

Paste

Clipboard

Font

Clipboard

Alignment

Clipboard

Number

Clipboard

Conditional Formatting

Clipboard

Format as Table

Clipboard

Cell Styles

Clipboard

Cells

Clipboard

Editing

Clipboard

Add-ins

Clipboard

Analyze Data

Clipboard

CONNECTOR

Clipboard

A27

*NODE ; Nodes

	A	B	C	D	E	F	G	H
7	9.5,5							
8								
9	*UNIT ; Unit System							
10	; FORCE, LENGTH, HEAT, TEMPER							
11	KN , M, J, C							
12								
13	*PROJINFO ; Project Information							
14	; PROJECT, REVISION, USER, EMAIL, ADDRESS, TEL, FAX							
15	; CHECK1, CDATE1, CHECK2, CDATE2, CHECK3, CDATE							
16	USER=±e4IE £							
17	ADDRESS=midasit							
18								
19	*STRUCTYPE ; Structure Type							
20	; ISTYP, IMASS, ISMAS, bMASSOFFSET, bSELFWEIGHT, C							
21	0, 1, 1, NO, YES, 9.806, 0, NO, NO, NO							
22								
23	*REBAR-MATL-CODE ; Rebar Material Code							
24	; CONC_CODE, CONC_MDB, SRC_CODE, SRC_MDB							
25	KS01-Civil(RC), SD300, KS01-Civil(RC), SD300							
26								
27	*NODE Nodes							
28	; INO, X, Y, Z							
29	1, 0, 0, 0							
30	2, 0.3, 0, 0							
31	3, 0.4, 0, 0							
32	4, 0.6, 0, 0							
33	5, 2.95, 0, 0							
34	6, 4, 0, 0							
35	7, 5.95, 0, 0							
36	8, 8.95, 0, 0							
37	9, 11.95, 0, 0							
38	10, 14.5, 0, 0							
39	11, 17.5, 0, 0							
40	12, 20.5, 0, 0							
41	13, 23.5, 0, 0							
42	14, 25.5, 0, 0							

NODE

MVLDCASE(TR)

MVLDCODE

NAMEDPLANE

NAMEDUCS

NBODYFORCE

NDTEMPER

NL-LINK

NL-PROP

NMOMENT-REDUCT

NODALMASS

NODE

MIDAS CONNECTOR

MXT Command

CIVIL NX

MCT_Parsing A27:A914

Header NODE

Name NODE

Folder Default

Add To Folder

Default

UNIT [MCT_Parsing!A9:A11]

NODE [MCT_Parsing!A27:A914]

All MXT Export

MIDAS CIVIL NX 2024 - [Untitled *] - [MIDAS CIVIL NX]

Project View Structure Node/Ele Property Boundary Load Analysis Results Pushover Design Rating Seismic i Apps

MCT Command Shell MCT Unit Member Design General Section Designer Sectional Property Calculator Tendon Profile Generator Smart Report Seismic Data Meta File Converter Text Editor Graphic Editor API

Tree Menu Task Pane Start Page MIDAS CIVIL NX

Tables Works Group Repo

Search

Works

Structures

Nodes 886

Y X

Command

U: 0, 0

22. Import and export function in Load Combinations

- In previous version, load combination data could be imported in *.lcb format, while it was exported in *.lcp format. The difference in file formats and structures between the import and export features made it challenging to generate load combinations outside of the dialog box.
- In the latest version, users can seamlessly import and export load combinations in a uniform MS Excel format, enhancing usability and workflow efficiency.

Results > Load Combinations

Load Combinations

GeneralSteel DesignConcrete DesignSRC DesignComposite Steel Girder Design

Load Combination List

No	Name	Active	Type	E	Description
1	cLCB1	Strengt	Add	☒	Strength-I: 1.75M[1]+0.50T[1]+1.00SM[1]+1.25(cD)+1.25(cEL
2	cLCB2	Strengt	Add	☒	Strength-I: 1.75M[1]+0.50T[2]+1.00SM[1]+1.25(cD)+1.25(cEL
3	cLCB3	Strengt	Add	☒	Strength-II: 1.35M[1]+0.50T[1]+1.00SM[1]+1.25(cD)+1.25(cEL
4	cLCB4	Strengt	Add	☒	Strength-II: 1.35M[1]+0.50T[2]+1.00SM[1]+1.25(cD)+1.25(cEL
5	cLCB5	Strengt	Add	☒	Strength-III: 1.4W[1]+0.50T[1]+1.00SM[1]+1.25(cD)+1.25(cEL
6	cLCB6	Strengt	Add	☒	Strength-III: 1.4W[1]+0.50T[2]+1.00SM[1]+1.25(cD)+1.25(cEL
7	cLCB7	Strengt	Add	☒	Strength-III: -1.4W[1]+0.50T[1]+1.00SM[1]+1.25(cD)+1.25(cEL
8	cLCB8	Strengt	Add	☒	Strength-III: -1.4W[1]+0.50T[2]+1.00SM[1]+1.25(cD)+1.25(cEL
9	cLCB9	Strengt	Add	☒	Strength-IV: 0.50T[1]+1.25(cD)+1.25(cEL)+1.00(cTS)+1.25(cC
10	cLCB10	Strengt	Add	☒	Strength-IV: 0.50T[2]+1.25(cD)+1.25(cEL)+1.00(cTS)+1.25(cC
11	cLCB11	Strengt	Add	☒	Strength-V: 1.35M[1]+0.4W[1]+0.50T[1]+1.00SM[1]+1.25(cD)
12	cLCB12	Strengt	Add	☒	Strength-V: 1.35M[1]+0.4W[1]+0.50T[2]+1.00SM[1]+1.25(cD)
13	cLCB13	Strengt	Add	☒	Strength-V: 1.35M[1]-0.4W[1]+0.50T[1]+1.00SM[1]+1.25(cD)
14	cLCB14	Strengt	Add	☒	Strength-V: 1.35M[1]-0.4W[1]+0.50T[2]+1.00SM[1]+1.25(cD)
15	cLCB15	Service	Add	☒	Service-I: 1.00M[1]+0.3W[1]+1.00T[1]+0.50TPG[1]+1.00SM[1]
16	cLCB16	Service	Add	☒	Service-I: 1.00M[1]+0.3W[1]+1.00T[1]+0.50TPG[2]+1.00SM[1]
17	cLCB17	Service	Add	☒	Service-I: 1.00M[1]+0.3W[1]+1.00T[2]+0.50TPG[1]+1.00SM[1]
18	cLCB18	Service	Add	☒	Service-I: 1.00M[1]+0.3W[1]+1.00T[2]+0.50TPG[2]+1.00SM[1]
19	cLCB19	Service	Add	☒	Service-II: 1.00M[1]-0.3W[1]+1.00T[1]+0.50TPG[1]+1.00SM[1]
20	cLCB20	Service	Add	☒	Service-II: 1.00M[1]-0.3W[1]+1.00T[1]+0.50TPG[2]+1.00SM[1]
21	cLCB21	Service	Add	☒	Service-II: 1.00M[1]-0.3W[1]+1.00T[2]+0.50TPG[1]+1.00SM[1]
22	cLCB22	Service	Add	☒	Service-II: 1.00M[1]-0.3W[1]+1.00T[2]+0.50TPG[2]+1.00SM[1]
23	cLCB23	Service	Add	☒	Service-III: 1.30M[1]+1.00T[1]+1.00(cD)+1.00(cEL)+1.00(cTS)+
24	cLCB24	Service	Add	☒	Service-III: 1.30M[1]+1.00T[2]+1.00(cD)+1.00(cEL)+1.00(cTS)+
25	cLCB25	Service	Add	☒	Service-III: 0.80M[1]+1.00T[1]+0.50TPG[1]+1.00SM[1]+1.00(c
26	cLCB26	Service	Add	☒	Service-III: 0.80M[1]+1.00T[1]+0.50TPG[2]+1.00SM[1]+1.00(c
27	cLCB27	Service	Add	☒	Service-III: 0.80M[1]+1.00T[2]+0.50TPG[1]+1.00SM[1]+1.00(c
28	cLCB28	Service	Add	☒	Service-III: 0.80M[1]+1.00T[2]+0.50TPG[2]+1.00SM[1]+1.00(c
29	cLCB29	Service	Add	☒	Service-IV: 1.00T[1]+1.00(cD)+1.00(cEL)+1.00(cTS)+1.00(cCF
30	cLCB30	Service	Add	☒	Service-IV: 1.00T[2]+1.00(cD)+1.00(cEL)+1.00(cTS)+1.00(cCF
31	cLCB31	Service	Add	☒	Fatigue: 0.75M[1]

Load Cases and Factors

LoadCase	Factor
MVL 1(MV)	1.7500
Uniform Temp(+)(ST)	0.5000
SM(SM)	1.0000

14-FSC Design (ASAS100_unsupported_model.ctb - Local)

No	Name	Active	Type	E	Description	Case 1	Type Factor	Case 2	Type Factor	Case 3	Type Factor	Case 4	Type Factor	C
1	cLCB1	Strengt	Add	☒	0 Strength-I: 1.75M[1]+0.50T[1]+1.00SM[1]+1.25(cD)+1.25(cEL	MV	1.75 Uniform Temp(+)	ST	0.5 SM	SM	1			
2	cLCB2	Strengt	Add	☒	0 Strength-I: 1.75M[1]+0.50T[2]+1.00SM[1]+1.25(cD)+1.25(cEL	MV	1.75 Uniform Temp(+)	ST	0.5 SM	SM	1			
3	cLCB3	Strengt	Add	☒	0 Strength-II: 1.35M[1]+0.50T[1]+1.00SM[1]+1.25(cD)+1.25(cEL	MV	1.35 Uniform Temp(+)	ST	0.5 SM	SM	1			
4	cLCB4	Strengt	Add	☒	0 Strength-II: 1.35M[1]+0.50T[2]+1.00SM[1]+1.25(cD)+1.25(cEL	MV	1.35 Uniform Temp(+)	ST	0.5 SM	SM	1			
5	cLCB5	Strengt	Add	☒	0 Strength-III: 1.4W[1]+0.50T[1]+1.00SM[1]+1.25(cD)+1.25(cEL	MV	1.4 Uniform Temp(+)	ST	0.5 SM	SM	1			
6	cLCB6	Strengt	Add	☒	0 Strength-III: 1.4W[1]+0.50T[2]+1.00SM[1]+1.25(cD)+1.25(cEL	MV	1.4 Uniform Temp(+)	ST	0.5 SM	SM	1			
7	cLCB7	Strengt	Add	☒	0 Strength-III: -1.4W[1]+0.50T[1]+1.00SM[1]+1.25(cD)+1.25(cEL	Wind	ST	1.4 Uniform Temp(+)	ST	0.5 SM	SM	1		
8	cLCB8	Strengt	Add	☒	0 Strength-III: -1.4W[1]+0.50T[2]+1.00SM[1]+1.25(cD)+1.25(cEL	Wind	ST	1.4 Uniform Temp(+)	ST	0.5 SM	SM	1		
9	cLCB9	Strengt	Add	☒	0 Strength-IV: 0.50T[1]+1.25(cD)+1.25(cEL)+1.00(cTS)+1.25(cC	Uniform Temp(+)	ST	0.5						
10	cLCB10	Strengt	Add	☒	0 Strength-IV: 0.50T[2]+1.25(cD)+1.25(cEL)+1.00(cTS)+1.25(cC	Uniform Temp(+)	ST	0.5						
11	cLCB11	Strengt	Add	☒	0 Strength-V: 1.35M[1]+0.4W[1]+0.50T[1]+1.00SM[1]+1.25(cD)	MV	1.35 Wind	ST	0.4 Uniform Temp(+)	ST	0.5 SM	SM	1	
12	cLCB12	Strengt	Add	☒	0 Strength-V: 1.35M[1]+0.4W[1]+0.50T[2]+1.00SM[1]+1.25(cD)	MV	1.35 Wind	ST	0.4 Uniform Temp(+)	ST	0.5 SM	SM	1	
13	cLCB13	Strengt	Add	☒	0 Strength-V: 1.35M[1]-0.4W[1]+0.50T[1]+1.00SM[1]+1.25(cD)	MV	1.35 Wind	ST	-0.4 Uniform Temp(+)	ST	0.5 SM	SM	1	
14	cLCB14	Strengt	Add	☒	0 Strength-V: 1.35M[1]-0.4W[1]+0.50T[2]+1.00SM[1]+1.25(cD)	MV	1.35 Wind	ST	-0.4 Uniform Temp(+)	ST	0.5 SM	SM	1	
15	cLCB15	Service	Add	☒	0 Service-I: 1.00M[1]+0.3W[1]+1.00T[1]+0.50TPG[1]+1.00SM[1]	MV	1 Wind	ST	0.3 Uniform Temp(+)	ST	1 Temp Grad(+)	ST	0.5 SM	
16	cLCB16	Service	Add	☒	0 Service-I: 1.00M[1]+0.3W[1]+1.00T[1]+0.50TPG[2]+1.00SM[1]	MV	1 Wind	ST	0.3 Uniform Temp(+)	ST	1 Temp Grad(+)	ST	0.5 SM	
17	cLCB17	Service	Add	☒	0 Service-I: 1.00M[1]+0.3W[1]+1.00T[2]+0.50TPG[1]+1.00SM[1]	MV	1 Wind	ST	0.3 Uniform Temp(+)	ST	1 Temp Grad(+)	ST	0.5 SM	
18	cLCB18	Service	Add	☒	0 Service-I: 1.00M[1]+0.3W[1]+1.00T[2]+0.50TPG[2]+1.00SM[1]	MV	1 Wind	ST	0.3 Uniform Temp(+)	ST	1 Temp Grad(+)	ST	0.5 SM	
19	cLCB19	Service	Add	☒	0 Service-II: 1.00M[1]-0.3W[1]+1.00T[1]+0.50TPG[1]+1.00SM[1]	MV	1 Wind	ST	0.3 Uniform Temp(+)	ST	1 Temp Grad(+)	ST	0.5 SM	
20	cLCB20	Service	Add	☒	0 Service-II: 1.00M[1]-0.3W[1]+1.00T[1]+0.50TPG[2]+1.00SM[1]	MV	1 Wind	ST	0.3 Uniform Temp(+)	ST	1 Temp Grad(+)	ST	0.5 SM	
21	cLCB21	Service	Add	☒	0 Service-II: 1.00M[1]-0.3W[1]+1.00T[2]+0.50TPG[1]+1.00SM[1]	MV	1 Wind	ST	0.3 Uniform Temp(+)	ST	1 Temp Grad(+)	ST	0.5 SM	
22	cLCB22	Service	Add	☒	0 Service-II: 1.00M[1]-0.3W[1]+1.00T[2]+0.50TPG[2]+1.00SM[1]	MV	1 Wind	ST	0.3 Uniform Temp(+)	ST	1 Temp Grad(+)	ST	0.5 SM	
23	cLCB23	Service	Add	☒	0 Service-III: 1.30M[1]+1.00T[1]+1.00(cD)+1.00(cEL)+1.00(cTS)+	MV	1 Wind	ST	-0.3 Uniform Temp(+)	ST	1 Temp Grad(+)	ST	0.5 SM	
24	cLCB24	Service	Add	☒	0 Service-III: 1.30M[1]+1.00T[2]+1.00(cD)+1.00(cEL)+1.00(cTS)+	MV	1 Wind	ST	-0.3 Uniform Temp(+)	ST	1 Temp Grad(+)	ST	0.5 SM	
25	cLCB25	Service	Add	☒	0 Service-III: 0.80M[1]+1.00T[1]+0.50TPG[1]+1.00SM[1]+1.00(c	MV	1.3 Uniform Temp(+)	ST						
26	cLCB26	Service	Add	☒	0 Service-III: 0.80M[1]+1.00T[1]+0.50TPG[2]+1.00SM[1]+1.00(c	MV	1.3 Uniform Temp(+)	ST						
27	cLCB27	Service	Add	☒	0 Service-III: 0.80M[1]+1.00T[2]+0.50TPG[1]+1.00SM[1]+1.00(c	MV	0.8 Uniform Temp(+)	ST	1 Temp Grad(+)	ST	0.5 SM	SM	1	
28	cLCB28	Service	Add	☒	0 Service-III: 0.80M[1]+1.00T[2]+0.50TPG[2]+1.00SM[1]+1.00(c	MV	0.8 Uniform Temp(+)	ST	1 Temp Grad(+)	ST	0.5 SM	SM	1	
29	cLCB29	Service	Add	☒	0 Service-IV: 1.00T[1]+1.00(cD)+1.00(cEL)+1.00(cTS)+1.00(cCF	MV	0.8 Uniform Temp(+)	ST	1 Temp Grad(+)	ST	0.5 SM	SM	1	
30	cLCB30	Service	Add	☒	0 Service-IV: 1.00T[2]+1.00(cD)+1.00(cEL)+1.00(cTS)+1.00(cCF	MV	0.8 Uniform Temp(+)	ST	1 Temp Grad(+)	ST	0.5 SM	SM	1	
31	cLCB31	Service	Add	☒	0 Fatigue: 0.75M[1]	Uniform Temp(+)	ST							
32	cLCB32	Service	Add	☒	0 Fatigue: 0.75M[1]	Uniform Temp(+)	ST							
33	cLCB33	Service	Add	☒	0 Fatigue: 0.75M[1]	MV	0.75							

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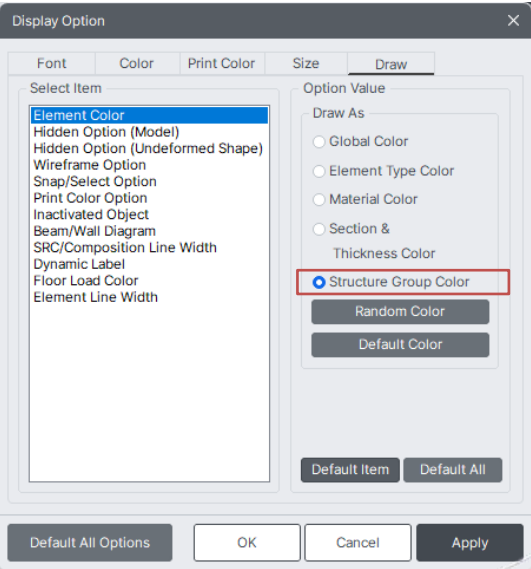
Load Combinations Dialog Box

Excel Format Load Combinations

23. Improvements to Element Color Display for Structural Groups

- In the previous version, when the Element Color option was set to display Structural Group Colors, elements belonging to more than two structural groups were displayed with a single color labeled as Duplicated Designation. This often occurred in models containing construction stages or moving load data, where elements were commonly assigned to multiple structural groups.
- In the new version, elements assigned to more than two structural groups will now be displayed based on the following priority:
 - Priority 1: The structural group with the smallest number of elements among the assigned structural groups.
 - Priority 2: The structural group listed first in the structural group order.
- This enhancement ensures clearer visualization and improved distinction between overlapping structural group assignments.

▪ View > Display > Display Option



Load Combinations Dialog Box

