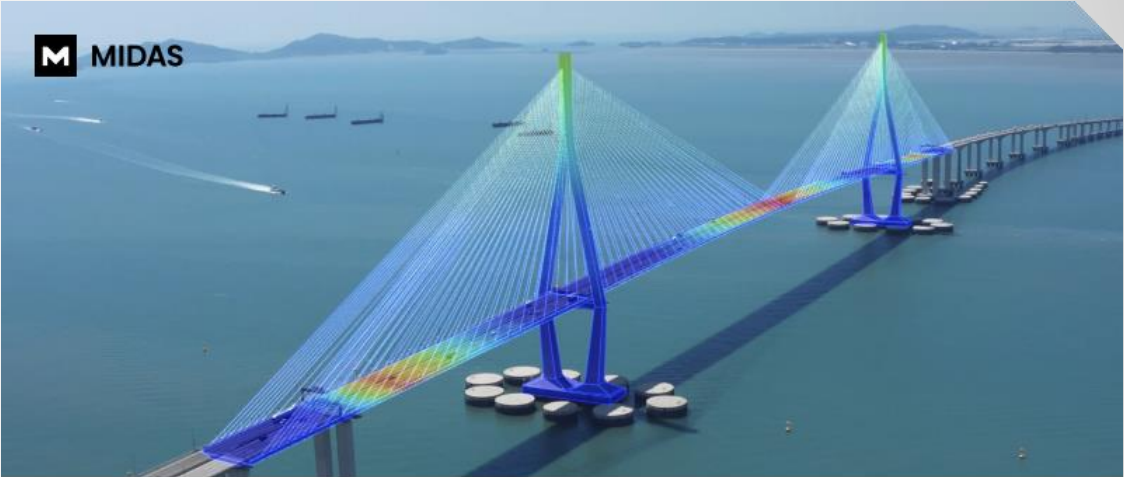


Release Note

Release Date : July 2025

Product Ver. : CIVIL NX 2025 (v2.1)



M MIDAS

CVL MIDAS CIVIL NX

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INTEGRATED SOLUTION SYSTEM FOR BRIDGE AND CIVIL ENGINEERING

MIDAS CIVIL NX is a state of the art software, which defines a new paradigm for bridge engineering and civil structures. It provides a distinctively easy user interface through its innovative graphic modules. MIDAS CIVIL NX provides an optimal design solution, which analyzes and designs all types of bridge structures in a 3D environment, accounting for construction stages and time-dependent properties.

DESIGN OF CIVIL STRUCTURES

Integrated Solution System for Bridge and Civil Engineering

Enhancements

Enhancements in CIVIL NX 2025 (v2.1)

1. *Addition of Material Database for Structural Steel Reinforcement as per NR/GN/CIV/025*
2. *Addition of Section Properties for U-girder Bridge as per NR/GN/CIV/025*
3. *Addition of Moving Load for UK Network Rail Bridge Assessment as per NR/GN/CIV/025*
4. *UK Network Rail Bridge Assessment as per NR/GN/CIV/025*
5. *Automated design support for asymmetric (Type 2) composite steel bridges(Eurocode, AASHTO)*
6. *RC design support for US railway bridges(Based on AREMA design code)*
7. *Update PSC section design criteria for Australia to the latest 2024 standard*
8. *Add California-specific provisions from AASHTO LRFD*
9. *Auto-generate Load combination (RC) as per TMH07 : 1981*
10. *PSC Design as per TMH07-3 : 1989*
11. *Significantly Improved Excel Design Report Generation Speed*



Enhancements

Enhancements in CIVIL NX 2025 (v2.1)

- 12. Moving patch load analysis as per Eurocode, BS & NZ traffic loads*
- 13. Addition of evaluation truck loads for existing bridges in New Zealand(Based on SP/M/022 v3.4)*
- 14. Addition of special permit trucks for load rating of existing bridges in Western Australia*
- 15. Enhancement of Australian moving load options: Add lateral offset distance option*
- 16. Enhancement of Load All Model 1 in the UK rating system to support envelope type loads*
- 17. Addition of vehicle database for 46 US states*
- 18. Addition of cross-section databases for the US and Canada*
- 19. Batch output for tendon loss table by construction stage and tendon group*
- 20. Flexible Dual Tree Menu Layout and External Docking*
- 21. Full Customization of Horizontal Toolbar Functions*
- 22. Addition of Active Fix and Zoom Fix for Stage to Status Bar*



1. Addition of Material Database for Structural Steel Reinforcement as per NR/GN/CIV/025

- To support bridge assessment in accordance with NR/GN/CIV/025, MIDAS CIVIL NX now includes a comprehensive set of steel and wrought iron materials used in UK railway structures from the pre-1906 era onward.
- **10 new material types** added to the database, including: Wrought Iron, **BS 2762:1956(A)**, **BS 2762:1956(B)**, **BS968:1962**, **BS968:1941**, **BS548:1934**, **BS15:1961**, **BS15:1948**, **BS15:1906**, **Pre1906**. This includes definition of **Yield strength values** by thickness.
- This addition enables accurate structural assessments for **existing UK railway bridges**, including heritage structures and simplifies compliance with Network Rail’s material classification and evaluation requirements.

- **Properties > Material Properties**
- **Rating > Steel Bridge > NR/GN/CIV/025 > Modify Steel Material**

Material Data

General

Material ID1NameWrought Iron

Elasticity Data

Type of DesignSteel



Type of Material

Isotropic

Orthotropic

Steel

Modulus of Elasticity1.9000e+08kN/m²

Poisson's Ratio0.3

Thermal Coefficient1.2000e-051/[C]

Weight Density75.51kN/m³

☐ Use Mass Density7.7kN/m³/g

Concrete

Modulus of Elasticity0.0000e+00kN/m²

Poisson's Ratio0

Thermal Coefficient0.0000e+001/[C]

Weight Density0kN/m³

☐ Use Mass Density0kN/m³/g

Plasticity Data

Steel

StandardNR/GN/CIV/025(S)

DB

Wrought Iron

Pre1906

BS15:1906

BS15:1948

BS15:1961

BS548:1934

BS968:1941

BS968:1962

BS2762:1956(A)

BS2762:1956(B)

Wrought Iron

Concrete

Standard

Code

DB

Material Properties

Modify Steel Material

Material List

ID	Name	Es	Fu	Fy1Fy1	Fy2
1	Wrought I...	1.9e+08	285000	190000	190000

Steel Material Selection

CodeNR/GN/CIV/025(S)GradeBS968:1941

Modulus of Elasticity (Es)205000000kN/m²

Poisson's Ratio (Ps)0.3

Tensile Strength (Fu)570000kN/m²

Yield Strength (Fy1)355000kN/m²

Yield Strength (Fy2)325000kN/m²

Yield Strength (Fy3)295000kN/m²

Yield Strength (Fy4)295000kN/m²

Yield Strength (Fy5)295000kN/m²

Close

Modify

Modify Steel Material

2. Addition of Section Properties for U-girder Bridge as per NR/GN/CIV/025

- Riveted steel plate girders can be defined, including detailed configuration of riveted angles. By accounting for rivet holes, the software automatically computes the net stiffness, which is then applied in the assessment for more accurate structural evaluation.

▪ Properties > Section Properties

Section Data

DB/User

Steel Girder

Section ID

2

Name

CG

Section Type

Steel Girder I

Size

☒ Symmetric Section Auto Calculation

Distance from Reference Line

Top

0

m

Bottom

0

m

Top

Bot

B1

B2

B3

B4

t1

t2

H

tw

Ref.

B1

0.3

H

0.6

m

B2

0.3

t1

0.014

m

B3

0.3

t2

0.014

m

B4

0.3

tw

0.014

m

Stiffener...

Riveted Angle...

Offset

Center-Bottom

☒ Consider Shear Deformation,

Change Offset ...

☐ Consider Warping Effect(7th DOF)

Show Calculation Results...

OK

Cancel

Apply

Riveted Angle

Defined Angles

Define Angles...

Name

Type

a

Angle

☒ Symmetric

☒ Angle 1

a

☒ Angle 2

a

☐ Angle 3

a

☐ Angle 4

a

☒ Angle 5

a

☒ Angle 6

a

☐ Angle 7

a

☐ Angle 8

a

☒ Rivet

Component	Angle	Ref.Pos (lateral)	Ref.Pos (vertical)	dR (m)	Diameter (m)
Top Left Flange	Angle 1	Left		0	0
Top Right Flange	Angle 5	Right		0	0
Web	Angle 1		Top	0	0
Web	Angle 2		Top	0	0
Bottom Left Flange	Angle 2	Left		0	0
Bottom Right Flange	Angle 6	Right		0	0

OK

Cancel

Riveted Steel Plate Girder

3. Addition of Moving Load for UK Network Rail Bridge Assessment as per NR/GN/CIV/025

- MIDAS CIVIL NX now supports Network Rail Standards-based moving load configurations for bridge assessment, in accordance with NR/GN/CIV/025. This enhancement ensures compliance with UK railway bridge evaluation guidelines and expands the platform's global code coverage.

- Key Features:**

- Vehicle Types Included:**

- Equivalent Uniformly Distributed Load (EUDL)

- RAI (RA1 ~ RA15)

- Load Wagon (Convoy Mode supported)

- Wagon Type D4 (as per UIC700 standard)

- Dynamic Factor Configuration:**

- Dynamic Amplification Factors (DAF) can be automatically calculated by defined *Determinant Length* and *group-based* selection.

- This enables accurate load effect estimation under various speed rail conditions.

- Track Factor Input:**

- Track Factor can be defined per lane in the Moving Load Case for consistent multi-track evaluation.

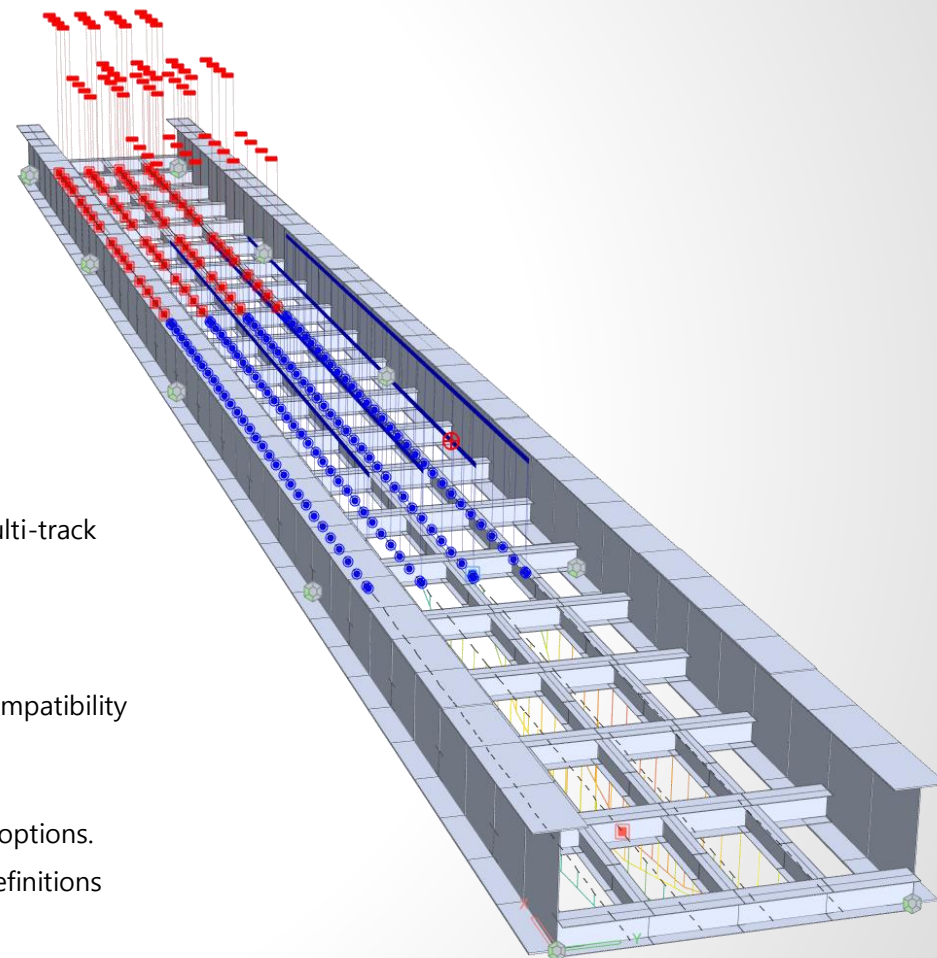
- Benefits:**

- EUDL (Equivalent Uniformly Distributed Load) automatically provided, enhancing compatibility with simplified evaluation methods.

- Provides detailed moving load simulation tailored to UK railway infrastructure.

- Allows for accurate modeling of various speed rail effects through Dynamic Factor options.

- Enables bridge engineers to perform assessments using familiar UK-specific load definitions and parameters.



- A new Railway Lane type has been added to support Network Rail moving load assessments, allowing users to define track-specific configurations aligned with UK railway standards.
- The following vehicle types have been newly added: Equivalent Uniformly Distributed Load (EUDL), RA1–RA15 load types, Load Wagon with Convoy Mode, and Wagon Type D4 in accordance with the UIC700 standard.

- **Load > Moving Loads > BS**
- **Load > Moving Loads > Traffic Line/Surface Lanes**
- **Load > Moving Loads > Vehicles**
- **Load > Moving Loads > Moving Load Cases**

The screenshot displays the software interface for defining vehicle loads. It includes several dialog boxes:

- Define Standard Vehicular Load (Left):** Shows 'Standard Name' as NR/GN/CIV/025, 'Vehicular Load Name' as EUDL Loading, 'Vehicular Load Type' as Type RAI Loading, and 'Sub Type' as EUDL.
- Define Standard Vehicular Load (Top Center):** Shows 'Standard Name' as NR/GN/CIV/025, 'Vehicular Load Name' as Assessment Load Wagon, 'Vehicular Load Type' as Wagon, and 'Sub Type' as Assessment Load Wagon.
- Define Standard Vehicular Load (Middle Center):** Shows 'Standard Name' as NR/GN/CIV/025, 'Vehicular Load Name' as EUDL Loading, 'Vehicular Load Type' as Type RAI Loading, and 'Sub Type' as EUDL. It also includes a diagram of a train load and a table of load parameters.
- Define Moving Load Case (Right Center):** Shows 'Load Case Name' as RA 10 S, 'Description' as empty, 'Moving Load Optimization' as unchecked, 'Select Load Model' as Standard Load (BD 37/01, BS 5400), 'Track Factor' as NR GN CIV 025 (Network Rail), and 'Sub-Load Cases' as Loading Effect (Combined, Independent).
- Traffic Lane Properties (Far Right):** Shows 'Lane Name' as Track 1, 'Lane Type' as Railway, 'Lane Width' as 3 m, 'Eccentricity' as 0 m, 'Wheel Spacing' as 1.6 m, 'Transverse Lane Optimization' as unchecked, 'Allowable Width' as 3 m, 'Vehicular Load Distribution' as Cross Beam, 'Cross Beam Group' as Cross Girder, 'Skew' as 0 deg, 'Moving Direction' as Both.

Train Database for UK Network Rail Bridge

Moving Load Cases

Traffic Line Lanes

3. Addition of Moving Load for UK Network Rail Bridge Assessment as per NR/GN/CIV/025

- Dynamic Factor in accordance with NR/GN/CIV/025 can now be applied either by automatic calculation based on determinant length or through user-defined input, providing flexibility and compliance with UK railway standards.
- The calculated Dynamic Factor can be checked in both the table view and the detail report of the Moving Load Tracer.

▪ **Load > Moving Loads > Railway Dynamic Factor**

Select Structure Group

☐ Cross Girder

☒ Main Girder

☐ Railbearer

☒ Auto Input

Bending and Shear

Natural Frequency, no1.5Hz

Span Length, L20m

Determinant Length, Lp20m

Permissible Speed of Track, v100mph

Depth of Ballast, h.05m

Angle of Skew, α90deg

(Longitudinal Member: 65 to 90, Transverse Member: 0 to 25)

Effects

Bending and Shear for Beam ElementAuto

All Other Effects1.3

(e.g.Axial, Torsion, Stress, Displacements, Reactions, etc)

Group List

no

L

Lp

Add

Modify

Delete

☐ User Input

OK

Cancel

Select Structure Group

☐ Cross Girder

☒ Main Girder

☐ Railbearer

☒ User Input

Effects

Bending for Beam Element1.3

Shear for Beam Element1.2

All Other Effects1.3

(e.g.Axial, Torsion, Stress, Displacements, Reactions, etc)

Group List

	Bending	Shear	Other
Cross Girder	1.3	1.2	1.3
Main Girder, Railbearer	1.4	1.3	1.4

Add

Modify

Delete

☐ Auto Input

OK

Cancel

Dynamic Factor

MidAS CIVIL NX 2025 - [D:\Dropbox\Dropbox\2025\Improvement\200_Civil\CR90_NR GN CIV Network Rail Bridge\workspace\Test 04_msd] - [MIDAS CIVIL NX]

Project

View

Structure

Node/Element

Properties

Boundary

Load

Analysis

Results

Pushover

Design

Rating

Apps

Moving Load CodeBS

Traffic Line Lanes

Traffic Surface Lanes

Vehicles

Moving Load Cases

Concurrent Vehicle Group

Vehicle Classes

Plate Element for Infilu. Surface

Railway Dynamic Factor

Inf. Lines

Inf. Surf.

MVL Tracer

Batch

File

Edit

View

Window

Help

Beam Forces/Moments

Moving Load Cases

Key Element

Scale Factor

Parts

Components

Type of Display

Maximum Value

Write Min/Max Load to File

Detail Result

00001

00002

00003

00004

00005

00006

00007

00008

00009

00010

00011

00012

00013

00014

00015

00016

00017

00018

00019

00020

00021

++ midas Civil BS Moving Load Data ++

• Moving Load Cases : MvmaxRA105

• Key Element : 11

• Parts : (1)

• Component : My

• Maximum Value : 4.0582e+01

[Lane1 : Track 1]

• Lane Factor(LF) : 0.75

• Railway Dynamic Factor : 1.4

[Lane2 : Track 2]

• Lane Factor(LF) : 0.75

• Railway Dynamic Factor : 1.4

Ready

Close

Apply

Command :

For Help, press F1

Frame-233

15, 8, 0

N: 0, E: 0

100%

Y

Z

X

15, 8, 0

N: 0, E: 0

100%

Moving Load Tracer

8

4. UK Network Rail Bridge Assessment as per NR/GN/CIV/025

- MIDAS CIVIL NX now supports a fully automated assessment process for railway bridge structures in accordance with Network Rail standards (NR/GN/CIV/025), including the ability to generate structured Excel reports summarizing all verification results.

- **Key Features:**

Automated Assessment Workflow

Perform Ultimate Limit State checks (Flexure, Shear, Longitudinal Shear, Intermediate and Bearing Stiffener) on main girders, cross girders, rail bearers, and stiffeners automatically after analysis.

Code Selection Flexibility

Assessment can be carried out based on either **NR/GN/CIV/025** or **BS 5400 Part 3**, allowing users to choose the appropriate code depending on project requirements.

Utilisation Factor Calculation

Includes auto-calculation of Utilisation Factors based on RA rating criteria, with support for historic steel materials (e.g., Wrought Iron, Early Steel).

Excel Report Output

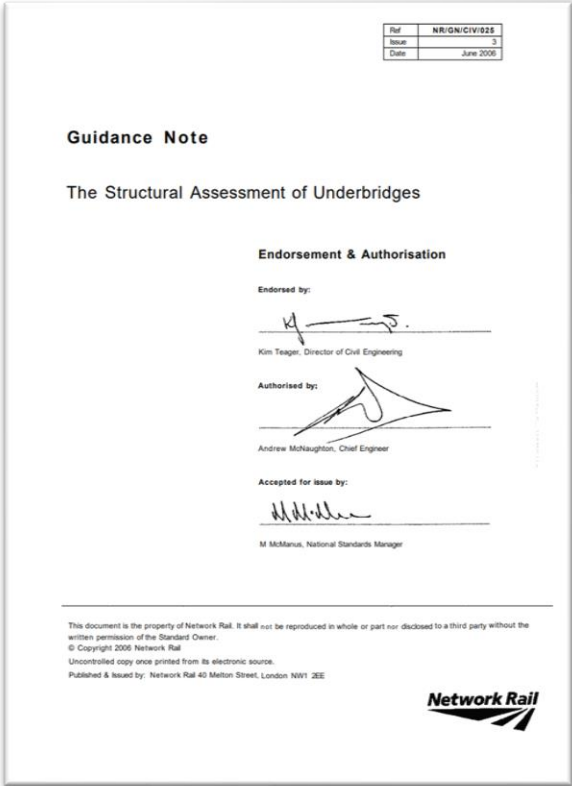
A detailed **Excel-format report** is generated, capturing all input parameters, applied load cases (e.g., RA1–RA15, EUDL), rating factors, section capacities, and final utilisation results.

Supports Various Design Inputs

Corrosion depth, riveted angle, effective length, and U-girder specific parameters are fully reflected in both calculation and reporting.

- **Benefits:**

- Streamlines compliance with UK Network Rail bridge assessment procedures.
- Minimizes manual input and post-processing by automating the full assessment-to-report pipeline.
- Produces **clear, exportable documentation** for design review, audit, and submission to authorities.



4. UK Network Rail Bridge Assessment as per NR/GN/CIV/025

- When **NR/GN/CIV/025** is selected in the **Steel Bridge Rating** menu, all relevant **input and output** menus specific to the Network Rail assessment criteria are displayed.

Rating > Steel Bridge > NR/GN/CIV/025

MDAS CIVIL NX 2025 - [D:\Dropbox\Dropbox\03_Improvement\206_Civil\0960_NR_GN_CIV_Network_Rail_Bridge\webinar\test_04.mxd] - [MDAS CIVIL NX]

Project

View

Structure

Node/Element

Properties

Boundary

Load

Analysis

Results

Pushover

Design

Rating

Apps

Steel Bridge

NR/GN/CIV/025-06

Assessment Code Option

Assessment Parameters

Modify Steel Material

Load Combinations

Section for Assessment

Parameter Tables

Perform Assessment

Assessment Result Tables

Assessment Result Report

Tables

Works

Group

Report

Start Page

Search

Works

Structures

Nodes [205]

Elements [284]

Beam [284]

Properties

Material [1]

1: Wrought Iron

Section [4]

2: CG

3: MG-Middle

4: Railbearer

5: MG-End

Boundaries

Supports [30]

Beam End Release [120]

Static Loads

Static Load Case 1 [DL:]

Self Weight [SZ=1]

Element Beam Loads [324]

Moving Load Analysis

Moving Load Code [B5]

Traffic Line Lanes [2]

Traffic Line Lane 1 [Track 1]

Traffic Line Lane 2 [Track 2]

Vehicles [4]

Vehicle 1 [F1] [Dynamic] [Standard]

Command

Node-22

29, 8, 0

N: 0, E: 0

m

100%

Assessment Code Parameters

Unbraced Length(L,Lb)

Span Length

Transverse Stiffener...

Web Panel Assignment...

Effective Length of U-frame

Moment Distribution Factor for Slenderness

Fastener-Rivets

Assign Member Type

Corrosion Depth

Base

Design Condition

Design Code

Design Type

Design Material

Design Section

Design Load

Design Factor

Design Result

Design Report

Section Properties

Section Name

Section Type

Section Material

Section Section

Section Load

Section Factor

Section Result

Section Report

Intermediate offset properties

Offset Name

Offset Type

Offset Material

Offset Section

Offset Load

Offset Factor

Offset Result

Offset Report

Material Properties

Material Name

Material Type

Material Material

Material Section

Material Load

Material Factor

Material Result

Material Report

Partial Safety Factors

Factor Name

Factor Type

Factor Material

Factor Section

Factor Load

Factor Factor

Factor Result

Factor Report

Partial safety factors for bolts (BS)

Factor Name

Factor Type

Factor Material

Factor Section

Factor Load

Factor Factor

Factor Result

Factor Report

Partial safety factors for welds (BS)

Factor Name

Factor Type

Factor Material

Factor Section

Factor Load

Factor Factor

Factor Result

Factor Report

Positive moment

Factor Name

Factor Type

Factor Material

Factor Section

Factor Load

Factor Factor

Factor Result

Factor Report

Web Fitting

Factor Name

Factor Type

Factor Material

Factor Section

Factor Load

Factor Factor

Factor Result

Factor Report

Yielding

Factor Name

Factor Type

Factor Material

Factor Section

Factor Load

Factor Factor

Factor Result

Factor Report

Buckling

Factor Name

Factor Type

Factor Material

Factor Section

Factor Load

Factor Factor

Factor Result

Factor Report

Intermediate Stiffener Result Summary

Factor Name

Factor Type

Factor Material

Factor Section

Factor Load

Factor Factor

Factor Result

Factor Report

Web Fitting

Factor Name

Factor Type

Factor Material

Factor Section

Factor Load

Factor Factor

Factor Result

Factor Report

Yielding

Factor Name

Factor Type

Factor Material

Factor Section

Factor Load

Factor Factor

Factor Result

Factor Report

Buckling

Factor Name

Factor Type

Factor Material

Factor Section

Factor Load

Factor Factor

Factor Result

Factor Report

Factor Name

Factor Type

Factor Material

Factor Section

Factor Load

Factor Factor

Factor Result

Factor Report

U-girder Bridge Assessment

Excel Report

4. UK Network Rail Bridge Assessment as per NR/GN/CIV/025

- In Assessment Parameter, Users can modify and apply condition factors, material factors, and other parameters as needed to suit specific project conditions.
- In the **assessment case**, when **static live load**, **dynamic live load**, and **dead load** are defined, the software automatically calculates the **utilisation factor** based on these inputs.

Rating > Steel Bridge > NR/GN/CIV/025

Assessment Parameter

Resistance Formula as per

☒ NR/GN/CIV/025

☐ BS5400 Part3

Required Route Availability Number

RA1

Condition Factor(Fc)

1

Material Strength used for Assessment

☒ Characteristic Strength

☐ Worst Credible Strength

Effective Length (BS5400 Part3, 9.6.4.1.1.2)

Span Type

☒ Simply Supported Spans

☐ Continuous Beams

k2

1

k3

1

U-frame Spacing

0

m

☒ Apply Equation A4 of NR/GN/CIV/025, 9.6.4.1.1.2A

☒ User Input

Modify Design Parameters

Ultimate Limit State

☒ Flexure

☒ Shear

☒ Longitudinal Shear

☒ Intermediate and Bearing Stiffener

OK

Cancel

Assessment Parameter

Define Assessment Case

Load Combination

	Name	Limit State	Comb. Type	Description
▶	EUDL	ULS	Comb1	
	RA 10	ULS	Comb1	
*				

Copy into Assessment Load Combination

Copy into General Load Combination

Static Load Cases and Factors(Gamma_{fl})

	Static Load Cases	Factor
▶	DL(ST)	1.2000
*		

Assessment Live Load

☒ Type RAI Loading

☐ Wagon Loading

Moving Load Cases and Factors(Gamma_{fl})

☒ Static (Dynamic Factor = 1)

EUDL S(MV)

1

☒ Dynamic (Dynamic Factor= 1 + phi)

EUDL D(MV)

1

Close

Assessment Case

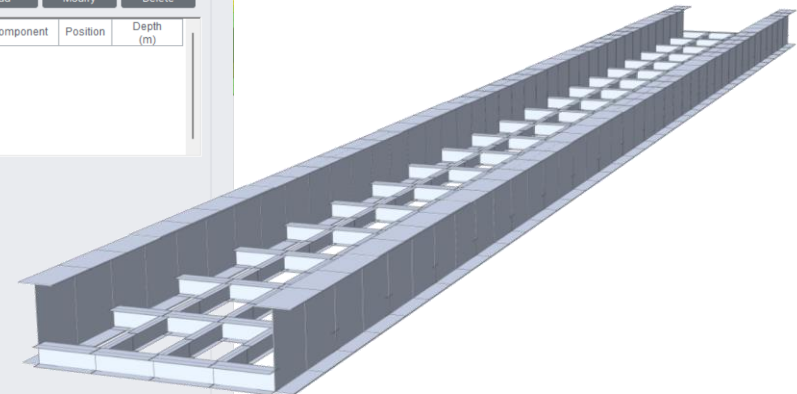
- **Transverse and bearing stiffeners** can be defined, along with **riveted angles** used for their reinforcement. These inputs are considered in the automatic calculation of **section properties**, which are then used directly in the assessment process.
- Assessment can be performed using **net section properties** that account for **corrosion depth**, ensuring more accurate evaluation of deteriorated structures.

The screenshot displays the 'Section Manager' software interface. On the left, the 'Stiffener Type' dialog box is open, showing the following settings:

- Type:** ☒ Located at U-frame
- Defined Shape:** A button labeled 'Define Shape...' is present.
- Name:** A table with two columns: 'Name' and 'Type'. It contains two entries: 'S' with 'Flat' type, and 'A' with 'Angle' type.
- Transverse Stiffener:**
 - Transverse Stiffener: S (selected from a dropdown)
 - Type: ☐ One stiffener, ☒ Two stiffener
 - Fy: 190000 kN/m²
 - Pitch: 0.7 m
 - Num. of U-frames in effective length: 5
 - Cross member rotation difference: 0.0036 [rad]
- Rivet Angle:**
 - Angle 1: A
 - Angle 2: A
 - Angle 3: A
 - Angle 4: A

At the bottom of the dialog are 'OK' and 'Cancel' buttons. The main workspace on the right shows a 3D model of a stiffener section. The 'Section Manager' panel on the far right includes a 'Mode' dropdown set to 'Corrosion Depth', a 'Grid' of 0.1 m, and a 'Snap' checkbox. Below this is a 'Target Section & Element' list showing 'Section : 4' with elements '2 : CG', '3 : MG-Middle', '4 : Railbearer', and '5 : MG-End'. The 'Corrosion Depth' panel on the right shows 'Component' as 'Top Flange', 'Position' as 'Top', and 'Corrosion Depth' as 0.04 m. A table below this panel has columns for 'Component', 'Position', and 'Depth (m)'. At the bottom right, there is a 3D perspective view of the stiffener assembly.

Corrosion Depth



4. UK Network Rail Bridge Assessment as per NR/GN/CIV/025

- After completing the assessment, results can be reviewed through both the **table view** and a generated **Excel report**.

Rating > Steel Bridge > NR/GN/CIV/025

Main Girder (Bending)										
Element	Part	Rating Case	Loading (kN/m)			Capacity (kN/m)	BSU		RA	
			Dead	Static	Dynamic		Static	Dynamic	Static	Dynamic
1	J13	Positive (max)	-16.949	0.558	3.496	-	-	-	-	-
2	J13	Positive (max)	-1184.805	1216.417	-	-	-	-	-	-
3	J14	Positive (max)	1184.805	1064.275	647.859	-	-	-	-	-
4	J14	Positive (max)	2177.280	2478.860	-	-	-	-	-	-
5	J15	Positive (max)	2184.762	3732.987	1286.587	-	-	-	-	-
6	J15	Positive (max)	2681.521	2985.194	-	-	-	-	-	-
7	J16	Positive (max)	2654.792	4542.517	1577.475	-	-	-	-	-
8	J16	Positive (max)	2935.749	3514.227	-	-	-	-	-	-
9	J17	Positive (max)	2932.225	6111.564	2642.452	-	-	-	-	-
10	J17	Positive (max)	2704.484	3293.999	-	-	-	-	-	-
11	J17	Positive (max)	2704.484	5812.839	2518.940	-	-	-	-	-
12	J18	Positive (max)	2254.418	3132.588	-	-	-	-	-	-
13	J18	Positive (max)	2260.340	5368.961	2338.550	-	-	-	-	-
14	J19	Negative (max)	1301.396	-31.122	-13.498	-	-	-	-	-
15	J19	Positive (max)	1301.396	2161.713	-	-	-	-	-	-
16	J19	Positive (max)	1307.688	3875.805	1679.516	-	-	-	-	-
17	J20	Positive (max)	132.440	1817.881	-	-	-	-	-	-
18	J20	Positive (max)	140.887	2261.589	980.913	-	-	-	-	-
19	J21	Positive (max)	-1529.661	92.895	-	-	-	-	-	-
20	J21	Positive (max)	-1529.661	163.932	71.837	-	-	-	-	-
21	J22	Positive (max)	-3409.488	-	-	-	-	-	-	-

Main Girder (Bearing Stiffener)										
Element	Part	Component	Rating Case	Loading (kN)			Capacity (kN)	BSU		RA
				Dead	Static	Dynamic		Static	Dynamic	
1	J13	Bearing Stiffener	max	0.876	17.243	-	-	-	-	-
2	J13	Intermediate Stiffener	max	-	-	-	-	-	-	-
3	J14	Bearing Stiffener	max	0.340	-	-	-	-	-	-
4	J14	Intermediate Stiffener	max	-	-	-	-	-	-	-
5	J15	Bearing Stiffener	max	0.070	17.243	-	-	-	-	-
6	J15	Intermediate Stiffener	max	-	-	-	-	-	-	-
7	J16	Bearing Stiffener	max	0.340	-	-	-	-	-	-
8	J16	Intermediate Stiffener	max	-	-	-	-	-	-	-
9	J17	Bearing Stiffener	max	2960.577	1587.951	-	-	-	-	-
10	J17	Intermediate Stiffener	max	-	-	-	-	-	-	-
11	J18	Bearing Stiffener	max	14347.96	-	-	-	-	-	-
12	J18	Intermediate Stiffener	max	-	-	-	-	-	-	-
13	J19	Bearing Stiffener	max	-17138.5	82676.35	-87.604	1872787	RA 15	-0.102	-
14	J19	Intermediate Stiffener	max	-	-	-	-	-	-	-
15	J20	Bearing Stiffener	max	-17138.5	82676.35	-87.604	1872787	RA 15	-0.102	-
16	J20	Intermediate Stiffener	max	-	-	-	-	-	-	-
17	J21	Bearing Stiffener	max	-17138.5	82676.35	-87.604	1872787	RA 15	-0.102	-
18	J21	Intermediate Stiffener	max	-	-	-	-	-	-	-
19	J22	Bearing Stiffener	max	-17138.5	82676.35	-87.604	1872787	RA 15	-0.102	-
20	J22	Intermediate Stiffener	max	-	-	-	-	-	-	-
21	J13	Bearing Stiffener	max	-	-	-	-	-	-	-
22	J13	Intermediate Stiffener	max	-	-	-	-	-	-	-
23	J14	Bearing Stiffener	max	-	-	-	-	-	-	-
24	J14	Intermediate Stiffener	max	-	-	-	-	-	-	-
25	J15	Bearing Stiffener	max	-	-	-	-	-	-	-
26	J15	Intermediate Stiffener	max	-	-	-	-	-	-	-
27	J16	Bearing Stiffener	max	-	-	-	-	-	-	-
28	J16	Intermediate Stiffener	max	-	-	-	-	-	-	-
29	J17	Bearing Stiffener	max	-	-	-	-	-	-	-
30	J17	Intermediate Stiffener	max	-	-	-	-	-	-	-
31	J18	Bearing Stiffener	max	-	-	-	-	-	-	-
32	J18	Intermediate Stiffener	max	-	-	-	-	-	-	-
33	J19	Bearing Stiffener	max	-	-	-	-	-	-	-
34	J19	Intermediate Stiffener	max	-	-	-	-	-	-	-
35	J20	Bearing Stiffener	max	-	-	-	-	-	-	-
36	J20	Intermediate Stiffener	max	-	-	-	-	-	-	-
37	J21	Bearing Stiffener	max	-	-	-	-	-	-	-
38	J21	Intermediate Stiffener	max	-	-	-	-	-	-	-
39	J22	Bearing Stiffener	max	-	-	-	-	-	-	-
40	J22	Intermediate Stiffener	max	-	-	-	-	-	-	-
41	J13	Bearing Stiffener	max	-	-	-	-	-	-	-
42	J13	Intermediate Stiffener	max	-	-	-	-	-	-	-
43	J14	Bearing Stiffener	max	-	-	-	-	-	-	-
44	J14	Intermediate Stiffener	max	-	-	-	-	-	-	-
45	J15	Bearing Stiffener	max	-	-	-	-	-	-	-
46	J15	Intermediate Stiffener	max	-	-	-	-	-	-	-
47	J16	Bearing Stiffener	max	-	-	-	-	-	-	-
48	J16	Intermediate Stiffener	max	-	-	-	-	-	-	-
49	J17	Bearing Stiffener	max	-	-	-	-	-	-	-
50	J17	Intermediate Stiffener	max	-	-	-	-	-	-	-
51	J18	Bearing Stiffener	max	-	-	-	-	-	-	-
52	J18	Intermediate Stiffener	max	-	-	-	-	-	-	-

Table Results

Main Girder (Bending)										
Pos	Assessment Case	Dead	Static	Dynamic	Capacity (N/m)	BSU		RA		Assessed Category
						Static	Dynamic	Static	Dynamic	
117	EUDL_FwdMax	1974.353	3368.555	0.000	0.000	0.000	0.000	RA 0	RA 0	A1
118	EUDL_FwdMax	1963.695	3173.134	0.000	0.000	0.000	0.000	RA 0	RA 0	A1

Main Girder (Bearing Stiffener)										
Pos	Assessment Case	Dead	Static	Dynamic	Capacity (N/mm)	BSU		RA		Assessed Category
						Static	Dynamic	Static	Dynamic	
117	EUDL_FwdMax	0.000	0.012	0.000	0.000	0.000	0.000	RA 0	RA 0	A1
118	EUDL_FwdMax	0.000	0.000	0.000	0.000	0.000	0.000	RA 0	RA 0	A1

Intermediate Stiffener Result Summary										
Pos	Assessment Case	Dead	Static	Dynamic	Capacity (N/mm)	BSU		RA		Assessed Category
						Static	Dynamic	Static	Dynamic	
117	EUDL_FwdMax	0.000	0.007	0.000	0.084	-252.782	1570000.000	RA 15	-0.040	A1
118	EUDL_FwdMax	0.000	0.000	0.000	0.137	1770000.000	1770000.000	RA 15	0.000	A1

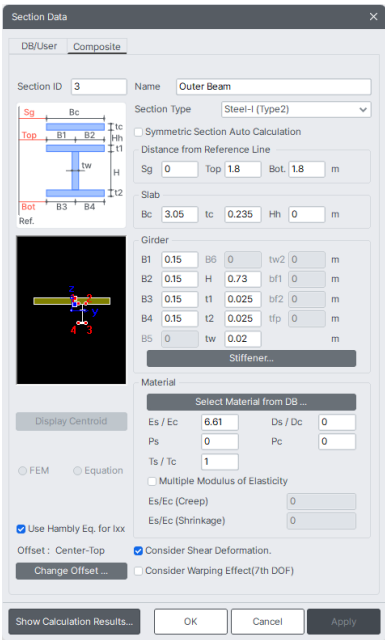
Bearing Stiffener Result Summary										
Pos	Assessment Case	Dead	Static	Dynamic	Capacity (N/mm)	BSU		RA		Assessed Category
						Static	Dynamic	Static	Dynamic	
117	EUDL_FwdMax	0.000	0.000	0.000	0.866	1770000.000	1770000.000	RA 15	0.000	A1
118	EUDL_FwdMax	0.000	0.000	0.000	0.866	1770000.000	1770000.000	RA 15	0.000	A1

Excel Report

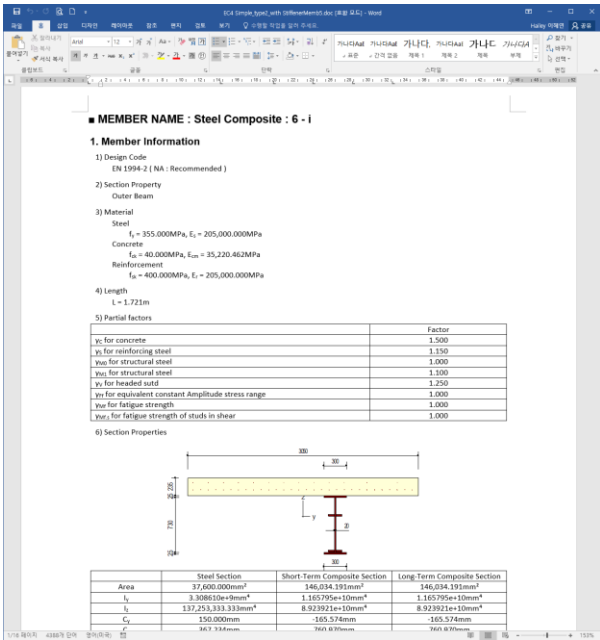
5. Automated design support for asymmetric (Type 2) composite steel bridges as per Eurocode4 & AASHTO LRFD

- In the case of exterior girders in girder bridges, the deck often needs to be modeled asymmetrically. However, previous versions did not support the design of such asymmetric sections in the automatic section design feature.
- Starting from this version, Steel Composite Design now supports asymmetric (Type 2) sections, in addition to the previously supported symmetric sections.
- The supported design codes are Eurocode 4 and AASHTO LRFD, and Type 2 section checks are available for Steel I-girders, Steel Tub girders, and Steel Box girders.

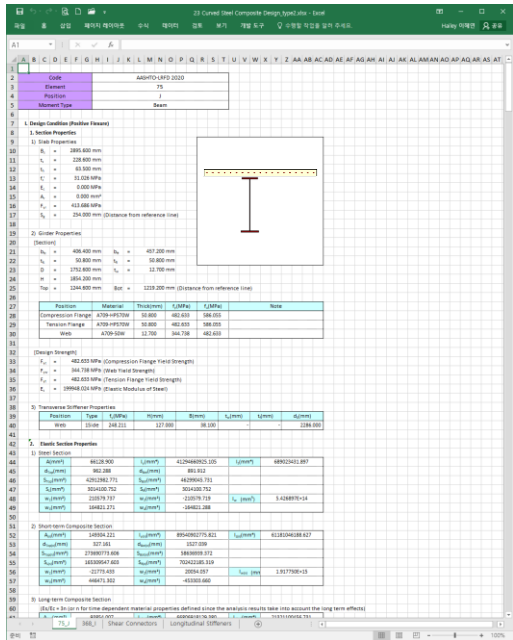
- **Properties > Section Properties**
- **Design > Composite Design > EN 1994-2 , AASHTO-LRFD20**



Composite Steel-I (Type2) Section



Steel Composite Design Report as per Eurocode4

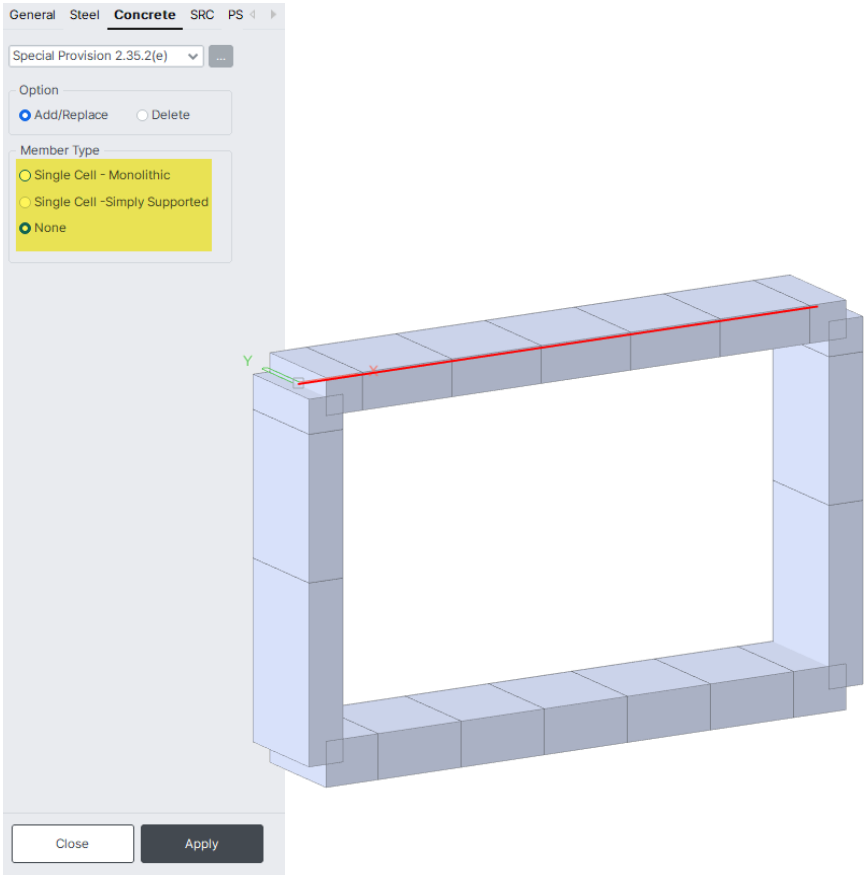


Steel Composite Design Report as per AASHTO LRFD

6. RC Design for 1D Beam & Column as per AREMA 2023

- A new option, "Special Provision 2.35.2(e)" has been added under Design Parameters to specify the type of box culvert.

Design > RC Design > Design Parameters > Special Provision 2.35.2(e)



Special Provision 2.35.2(e)

Concrete Structures and Foundations

$$v_c = 2 \left(1 + 0.0005 \frac{N_u}{A_g} \right) \sqrt{f'_c}$$
 EQ 2-47

$$v_c = 0.17 \left(1 + 0.072 \frac{N_u}{A_g} \right) \sqrt{f'_c}$$
 EQ 2-47M

The quantity $\frac{N_u}{A_g}$ shall be expressed in psi (MPa).

- d. For members subject to significant axial tension, shear reinforcement shall be designed to carry the total shear, unless a more detailed analysis is made using

$$v_c = 2 \left(1 + 0.002 \frac{N_u}{A_g} \right) \sqrt{f'_c}$$
 EQ 2-48

$$v_c = 0.17 \left(1 + 0.29 \frac{N_u}{A_g} \right) \sqrt{f'_c}$$
 EQ 2-48M

where:

N_u is negative for tension

the quantity $\frac{N_u}{A_g}$ shall be expressed in psi (MPa).

- e. Special provisions for slabs of box culverts. For slabs of box culverts under rail with 18 inches (450 mm) or more of fill (base of rail to top of culvert), shear stress v_c may be computed by:

$$v_c = 2.14 \sqrt{f'_c} + 4600 \rho \frac{V_u d}{M_u}$$
 EQ 2-49

$$v_c = 0.18 \sqrt{f'_c} + 32 \rho \frac{V_u d}{M_u}$$
 EQ 2-49M

but v_c shall not exceed $4 \sqrt{f'_c}$ (or $\frac{1}{3} \sqrt{f'_c}$ in metric). For single cell box culverts only, v_c need not be taken

less than $3 \sqrt{f'_c}$ (or $\frac{\sqrt{f'_c}}{4}$ in metric) for slabs monolithic with walls or $2.5 \sqrt{f'_c}$ (or $\frac{5}{24} \sqrt{f'_c}$ in metric)

for slabs simply supported. The quantity $\frac{V_u d}{M_u}$ shall not be taken greater than 1.0, where M_u is factored moment occurring simultaneously with V_u at section considered.

6. RC Design for 1D Beam & Column as per AREMA 2023

- Design and checking of RC frame elements to AREMA 2023 are newly introduced in midas.
- This feature can be applied to RC beam & RC column (T-girder, diaphragm, pier, pier cap & other related substructure components).
- The detailed design report provides calculations in both SI and US units, available in Word format.

■ Design > RC Design > RC Code Design > Beam/Column Design

AREMA-2023 RC-Beam Design Result Dialog

Code : AREMA-2023 Unit : kN , mm Primary Sorting Option

Sorted by ☒ Member ☐ Section

Negative Moment

Positive Moment

Shear & Torsion

MEMB	SECT	SEL	Section	fc	POS	CHK	N(-) Mu	LCB	AsTop	P(+) Mu	LCB	AsBot	vu	LCB	AsV	Tu	LCB	St	Stirrups	
Span			b _f	h _f	f _{ys}															
7			Pier Cap Mid	0.04826	I	OK	2.9E+07	1-F	29121	0.00000	3	0.0000	0.00572	1-F	17.578	4376.23	2-F	101.83	9.0-#5 @100	
8	☒		1500, 2000, 0.0000	0.0000	0.41369	M	OK	2.6E+07	1-F	37933	0.00000	3	0.0000	0.00573	1-F	17.528	4376.23	2-F	102.69	9.0-#5 @100
750.00			0.0000	0.0000	0.41369	J	OK	2.8E+07	1-F	42465	0.00000	3	0.0000	0.00574	1-F	17.451	4376.23	2-F		
8	☐		Pier Cap Mid	0.04826	I	OK	2.0E+07	1-F	29021	0.00000	3	0.0000	0.00570	1-F	17.605	1040.10	1			
8	☐		1500, 2000, 0.0000	0.0000	0.41369	M	OK	2.6E+07	1-F	37800	0.00000	3	0.0000	0.00571	1-F	17.458	1040.10	1		
750.00			0.0000	0.0000	0.41369	J	OK	2.8E+07	1-F	42315	0.00000	3	0.0000	0.00572	1-F	17.381	1040.10	1		
9	☐		Pier Cap Mid	0.04826	I	OK	2.9E+07	1-M	42586	0.00000	3	0.0000	0.00576	1-F	17.520	5359.33	2			
8	☐		1500, 2000, 0.0000	0.0000	0.41369	M	OK	2.6E+07	1-M	38037	0.00000	3	0.0000	0.00575	1-F	17.520	5359.33	2		
750.00			0.0000	0.0000	0.41369	J	OK	2.0E+07	1-M	29195	0.00000	3	0.0000	0.00574	1-F	17.598	5359.33	2		
10	☐		Pier Cap Mid	0.04826	I	OK	2.8E+07	1-M	42510	0.00000	3	0.0000	0.00575	1-F	17.492	1040.95	1			
8	☐		1500, 2000, 0.0000	0.0000	0.41369	M	OK	2.6E+07	1-M	37969	0.00000	3	0.0000	0.00574	1-F	17.492	1040.95	1		
750.00			0.0000	0.0000	0.41369	J	OK	2.0E+07	1-M	29140	0.00000	3	0.0000	0.00573	1-F	17.569	1040.95	1		

☐ Connect Model View

Select All Unselect All Re-calculation

Graphic... Summary... Summary By LCB <<

Detail... C:\Users\midas\OneDrive - MIDAS\A

Option for Detail Print Position
☒ End I ☐ Mid ☐ End J

Close

Result View Option
☒ All ☐ OK ☐ NG

Copy Table

AREMA-2023 RC-Beam Checking Result Dialog

Code : AREMA-2023 Unit : kN , mm Primary Sorting Option

Sorted by ☒ Member ☐ Section

Strength

Serviceability

Stress Check

MEMB	SECT	SEL	Section	fc	POS	CHK	Stress Control				
Span			b _f	h _f	f _{ys}		Top-s	Top-sa	Bot-s	Bot-sa	
7			Pier Cap Mid	0.04826	I	OK	205.00	206.00	0.0000	206.00	
8	☒		1500, 2000, 0.0000	0.0000	0.41369	M	OK	184.00	206.00	0.0000	206.00
750.00			0.0000	0.0000	0.41369	J	OK	205.00	206.00	0.0000	206.00
8	☐		Pier Cap Mid	0.04826	I	OK	204.00	206.00	0.0000	206.00	
8	☐		1500, 2000, 0.0000	0.0000	0.41369	M	OK	184.00	206.00	0.0000	206.00
750.00			0.0000	0.0000	0.41369	J	OK	204.00	206.00	0.0000	206.00
9	☐		Pier Cap Mid	0.04826	I	T*	292.00	206.00	0.0000	206.00	
8	☐		1500, 2000, 0.0000	0.0000	0.41369	M	OK	185.00	206.00	0.0000	206.00
750.00			0.0000	0.0000	0.41369	J	OK	144.00	206.00	0.0000	206.00
10	☐		Pier Cap Mid	0.04826	I	T*	292.00	206.00	0.0000	206.00	
8	☐		1500, 2000, 0.0000	0.0000	0.41369	M	OK	184.00	206.00	0.0000	206.00
750.00			0.0000	0.0000	0.41369	J	OK	144.00	206.00	0.0000	206.00

☐ Connect Model View

Select All Unselect All Re-calculation

Graphic... Summary... Summary By LCB <<

Detail... C:\Users\midas\OneDrive - MIDAS\A

Option for Detail Print Position
☒ End I ☐ Mid ☐ End J

Close

Result View Option
☒ All ☐ OK ☐ NG

Copy Table

Design Result Table

MIDAS Information Technology Co.,Ltd.
MIDAS CIVIL NX 2025 (v1.1) / Design

■ MEMBER NAME : Pier (Section ID : 9, Element No.1)

1. Member Information

1) Design Code
AREMA-2023

2) Section Property
Pier (ID : 9)

3) Material
Concrete
 $f_c = 48.263\text{MPa}$, $E_c = 0.043w_c^{1.5}f_c^{0.5} = 35,219.834\text{MPa}$
Reinforcement
 $f_y = 413.686\text{MPa}$, $f_u = 413.686\text{MPa}$, $E_s = 199,948.024\text{MPa}$

4) Length
 $L = 10.000\text{m}$

5) Reinforcement Data

1500

1500

End Part

Main
22,500.00mm²

Tie Stirrups
2-#3@273

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

Axial and moment	LCB	Strength Group I-FX		
		$P_u / \phi P_n$	$M_u / \phi M_n$	
	$P_u / \phi P_n$	30,926.254kN / 60,413.089kN = 0.512		OK
	$M_u / \phi M_n$	7.118kN-m / 17.308kN-m = 0.411		OK
	$M_u / \phi M_n$	97.692kN-m / 237.556kN-m = 0.411		OK
	$M_u / \phi M_n$	97.950kN-m / 238.186kN-m = 0.411		OK
	$p_{min} \leq p \leq p_{max}$	$p_{min} = 0.01000 \leq p = 0.01000 \leq p_{max} = 0.08000$		OK

* Strength Group I-FX : (1.400) Dead Load, FX minimum concurrent force

Detailed Design Report

7. Update PSC section design criteria for Australia to the latest 2024 standard

- The PSC Design feature has been updated to support the latest amendment of the Australian bridge design standard: AS 5100.5:2017 Amendment 2024.
- **Key Updates** : Support for the 2024 Amendment is now available in the PSC Design Parameters.
Updated reinforcing steel material properties in accordance with the new amendment.
All relevant design equations and checks have been revised to comply with the updated provisions.
- This update ensures that engineers can perform PSC design fully aligned with the most current Australian bridge design standards.

Design > PSC Design > AS 5100.5:17 > Amd 2:2024

PSC Design Code

Design Code

AS 5100.5:17

Amendments :

Amd 2:2024

Input Parameters

Maximum nominal aggregate size (8.2.4.2)

d_g

0.016

m

Crack Control

Maximum Increment of Steel Stress

160000

kN/m²

Output Parameters

Ultimate limit states

☐ Transfer Check

☐ Flexural resistance

☐ Shear resistance

☐ Torsional resistance

Serviceability limit state

☐ Control of Cracking

PSC Design Parameter as per AS5100:5 Amd 2:2024

AS 5100.5:2017 Amd 2:2024

Bridge design, Part 5: Concrete

This Australian Amendment was prepared by BD-090, Br Standards Australia's Standards Development and Accreditation Committee.

Published: 24 May 2024
Draft published as: DR AS 5100.5:2017 Amd 2:2024
Committee: BD-090
Committee members: ARRB (Australian Road Research Board), Australian Industry Group, Australian Steel Institute, Austroads Ltd., Bureau of Steel Manufacturers of Australia, Cement Concrete & Aggregates Institute of Australia, Concrete NZ Inc, Concrete Pipe Association of Australia, Consult Australia, Engineers Australia, Independent Chairperson (Australian Institute of Public Works Engineering), National Precast Concrete Association, New Zealand Heavy Engineering, Queensland University of Technology, Rail Industry Safety and Standards New Zealand (SNZ), Steel Construction New Zealand, Steel Reinforcement Institute of The University of Sydney, WSP New Zealand Ltd, Waka Kotahi-NZ Transport Agency

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1. Design Condition									
Design code	AS5100.5-17 Amd2:24	Element	Node(3)						
Section Properties									
Composite									
Gross section									
Before									
H (mm)	1500.0	1500.0							
B (mm)	2100.0	2900.0							
C _{top} (mm)	823.3	389.7							
C _{bot} (mm)	676.7	1110.3							
A _g (mm ²)	5.937E+06	1.058E+08							
I _g (mm ⁴)	1.588E+11	3.802E+11							
S _x (mm ³)	1.929E+08	4.075E+08							
S _y (mm ³)	2.347E+08	1.431E+08							
S _{xx} (mm ⁴)	8.974E+08								
S _{yy} (mm ⁴)		9.756E+08							
Transformed section									
Before									
H (mm)	1500.0	1500.0							
B (mm)	2100.0	2900.0							
C _{top} (mm)	850.3	414.8							
C _{bot} (mm)	648.7	1085.2							
A _g (mm ²)	8.888E+06	1.090E+08							
I _g (mm ⁴)	1.669E+11	4.081E+11							
S _x (mm ³)	1.963E+08	4.023E+08							
S _y (mm ³)	2.569E+08	1.538E+08							
S _{xx} (mm ⁴)		8.392E+08							
S _{yy} (mm ⁴)		9.166E+08							
Materials									
Concrete									
f _c (MPa)									
E _c (MPa)									
f _{yk} = 0.64f _c (MPa)									
α _s									
γ									
Order	50 000	34 800 000	4.243	0.85	0.70				
Step	65 000	27 400 000	4.637	0.81	0.67				
* α _s = 1.0 - 0.003f _c (within the limits of 0.67 ≤ α _s ≤ 0.85)									
* γ = 1.05 - 0.007f _c (within the limits of 0.67 ≤ γ ≤ 0.85)									
Prestressing steel information									
No.	Tendon name	Bond type	d _b (mm)	A _{ps} (mm ²)	Strength (MPa)		E _s (MPa)		
					f _{yk}	f _{pu}			
1	S_Span1-175	Bond	1465.0	136.7	1568.1	1863.3	205000.0		
2	S_Span1-145	Bond	1465.0	136.7	1568.1	1863.3	205000.0		
3	S_Span1-155	Bond	1515.0	136.7	1568.1	1863.3	205000.0		
4	S_Span1-145	Bond	1565.0	136.7	1568.1	1863.3	205000.0		
5	S_Span1-135	Bond	1615.0	136.7	1568.1	1863.3	205000.0		
6	S_Span1-148	Bond	1465.0	136.7	1568.1	1863.3	205000.0		
7	S_Span1-158	Bond	1515.0	136.7	1568.1	1863.3	205000.0		
8	S_Span1-148	Bond	1565.0	136.7	1568.1	1863.3	205000.0		
9	S_Span1-138	Bond	1615.0	136.7	1568.1	1863.3	205000.0		
10	S_Span1-149	Bond	1465.0	136.7	1568.1	1863.3	205000.0		
11	S_Span1-159	Bond	1515.0	136.7	1568.1	1863.3	205000.0		
12	S_Span1-149	Bond	1565.0	136.7	1568.1	1863.3	205000.0		
13	S_Span1-139	Bond	1615.0	136.7	1568.1	1863.3	205000.0		
14	S_Span1-172	Bond	1465.0	136.7	1568.1	1863.3	205000.0		
15	S_Span1-162	Bond	1515.0	136.7	1568.1	1863.3	205000.0		
16	S_Span1-152	Bond	1565.0	136.7	1568.1	1863.3	205000.0		
17	S_Span1-142	Bond	1665.0	136.7	1568.1	1863.3	205000.0		
18	S_Span1-173	Bond	1465.0	136.7	1568.1	1863.3	205000.0		
19	S_Span1-163	Bond	1515.0	136.7	1568.1	1863.3	205000.0		
20	S_Span1-153	Bond	1515.0	136.7	1568.1	1863.3	205000.0		
21	S_Span1-143	Bond	1565.0	136.7	1568.1	1863.3	205000.0		
22	S_Span1-133	Bond	1615.0	136.7	1568.1	1863.3	205000.0		
23	S_Span1-170	Bond	1465.0	136.7	1568.1	1863.3	205000.0		
24	S_Span1-160	Bond	1515.0	136.7	1568.1	1863.3	205000.0		
25	S_Span1-150	Bond	1565.0	136.7	1568.1	1863.3	205000.0		
26	S_Span1-140	Bond	1615.0	136.7	1568.1	1863.3	205000.0		
27	S_Span1-171	Bond	1465.0	136.7	1568.1	1863.3	205000.0		
28	S_Span1-161	Bond	1515.0	136.7	1568.1	1863.3	205000.0		
29	S_Span1-151	Bond	1565.0	136.7	1568.1	1863.3	205000.0		

PSC Design Report

MIDAS

17

8. Add California-specific provisions from AASHTO LRFD

- To meet the specific requirements of California bridge projects, MIDAS CIVIL NX now supports the California Amendment to AASHTO LRFD design specifications.
- Applicable Design Modules : Steel Design, RC Design, PSC Design, Steel Composite Design
- Users can now perform code checks and design in full compliance with California Department of Transportation (Caltrans) standards, ensuring regional accuracy and approval readiness.

- **Design > Steel Design > AASHTO-LRFD17 > California Amendments**
- **Design > RC Design > AASHTO-LRFD17 > California Amendments**
- **Design > PSC Design > AASHTO-LRFD17 > California Amendments**
- **Design > Composite Design > AASHTO-LRFD17 > California Amendments**

Concrete Design Code

Design Code: AASHTO-LRFD17(US)

Amendments: California

☐ Apply Special Provisions for Seismic Design

☐ Consider Axial-Moment Interaction for Plate Column

Moment Redistribution Factor for Beam: 1

OK Close

RC Design – CA Amendment

Steel Design Code

Design Code: AASHTO-LRFD17(US)

Amendments: California

☐ All Beams/Girders are Laterally Braced

☐ Check Beam/Column Deflection

OK Close

Steel Design – CA Amendment

PSC Design Code

Design Code: AASHTO-LRFD17

Amendments: California

Input Parameters

Tendon Type

- ☒ Low Relaxation Tendons
- ☐ Stress Relieved Tendons
- ☐ Prestressing Bars

Corrosive Condition

- ☒ Severe
- ☐ Moderate/Mild

Flexural Strength

- ☒ Code
- ☐ Strain Compatibility

Exposure Factor for Crack Width

- ☒ Class I (1.0)
- ☐ Class II (0.75)
- ☐ User: 1

Construction Type

- ☐ Segmental
- ☒ Non-Segmental

Manufacturing for Post Tensioning

- ☒ Cast-in-place
- ☐ Precast

Output Parameters

At Construction Stage/Service Loads

- ☒ Stress by Construction Stage
- ☒ Stress by Service Load Combinations
- ☒ Stress in Prestressing Tendons
- ☒ Principal Stress by Construction Stage
- ☒ Principal Stress by Service Load Combinations (Max Shear)
- ☒ Principal Stress by Service Load Combination (Max Torsion)
- ☒ Crack Check

At Factored Loads

- ☒ Flexural Strength Check
- ☒ Shear Strength Check
- ☒ Combined Shear and Torsion Check

Select All Unselect All

OK Cancel

PSC Design – CA Amendment

Composite Steel Girder Design Code

Code: AASHTO-LRFD17

AM: Recommended

Update by Code

Strength Resistance Factor

Resistance factor for yielding (Phi_{Ly}): 0.95

Resistance factor for fracture (Phi_{Lu}): 0.8

Resistance factor for axial comp. (Phi_{Lc}): 0.9

Resistance factor for flexure (Phi_{Lf}): 1

Resistance factor for shear (Phi_{Lv}): 1

Resistance factor for shear connector (Phi_{Lsc}): 0.85

Resistance factor for bearing (Phi_{Lb}): 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

Steel Composite Design – CA Amendment

9. Auto-generate Load combination (RC) as per TMH07 : 1981

- Load combination are generated as per Table 17 of TMH07 : 1981
- For automatically generated load combinations, the SLS combinations are classified according to TMH07-1981 for serviceability checks under PSC Design.

Results > Load Combination > Concrete Design > Auto Generation > TMH07: 1981

Type of action	Nominal actions F _k	Notation	Clause number	Limit state	γ _f = γ _{f1} , γ _{f2} , γ _{f3} to be considered in combinations			ULS = Ultimate Limit State SLS = Serviceability Limit State
					1	2	3	
PRINCIPAL ACTIONS	Dead loads: concrete	G _k	2.2.2	ULS SLS	1.2 1.0	1.05 1.0	1.2 1.0	ULS = Ultimate Limit State SLS = Serviceability Limit State
	Dead loads: steel	G _k	2.2.2	ULS SLS	1.1 1.0	1.0 1.0	1.1 1.0	
	Superimposed dead loads	S _k	2.3.3	ULS SLS	1.2 1.0	1.05 1.0	1.2 1.0	
	Reduced load for dead and superimposed dead load where this has a more severe effect	G _k	2.2.2.2 2.3.2.2	ULS SLS	1.0 1.0	1.0 1.0	1.0 1.0	
	Vertical earth loading on culverts	Method (i) Methods (ii) & (iii)	2.3.3.3 2.3.3.3	ULS SLS	1.3 1.1	1.3 1.1	1.5 1.1	
	Earth pressure due to retained fill	Approximate theory More accurate theory	2.4.3 2.4.3	ULS SLS	1.5 1.4	1.3 1.2	1.5 1.4	
	As above but causing relieving effect		2.4.3	ULS SLS	1.0 1.0	1.0 1.0	1.0 1.0	
	Water pressure of retained or excluded water		2.5.2	ULS SLS	1.2 1.0	1.05 1.0	1.2 1.0	
	As above but causing relieving effect		2.5.2	ULS SLS	1.0 1.0	1.0 1.0	1.0 1.0	
	Vehicle traffic loading and surcharge	NA NB NC = ½ NA on separate carriageways	2.6.3.3 2.6.4.3 2.6.5.3	ULS SLS ULS SLS	1.5 1.2 1.2	1.3 1.0 1.0	1.5 1.1 1.0	
	Sidewalk and cycle track loading		2.7.1.2	ULS SLS	1.5 1.0	1.3 1.0	1.5 1.0	
	Erection loads		2.8.2.2	ULS SLS	—	1.15 1.0	—	
	Centrifugal forces		3.2.4	ULS SLS	—	1.50 1.0	—	
	Longitudinal braking and traction forces	NA load NB load	3.3.6 3.6.4	ULS SLS	—	1.25 1.0	—	
	Accidental skidding		3.4.4	ULS SLS	—	1.25 1.0	—	
TRANSIENT ACTIONS	Impact due to vehicle collision with bridge balustrades or parapets		3.5.4	ULS SLS	—	1.25 1.0	—	ULS = Ultimate Limit State SLS = Serviceability Limit State
	Impact due to vehicle collision with bridge supports		3.7.5	ULS SLS	—	1.25 1.0	—	
	Wind action	(a) (b) (c) (d)	3.8.7 3.8.7 3.8.7 3.8.7	ULS SLS ULS SLS	— — — —	1.1 1.0 1.4 1.0	— — 1.0 1.0	
	Flood action		3.9.8	ULS SLS	—	1.05 0.85	1.3 1.0	
	Earthquake action		3.10.5	ULS SLS	—	—	1.3 1.0	
	Creep and shrinkage	F _{cr} , F _{sh}	4.2.2	ULS SLS	1.0 1.0	1.0 1.0	1.0 1.0	
	Parasitic prestress and prestress	F _{ps} , F _{ps}	4.3.2	ULS SLS	1.0 1.0	1.0 1.0	1.0 1.0	
	Differential settlement		4.4.2	ULS SLS	1.0 1.0	1.0 1.0	1.0 1.0	
	Temperature range		4.5.8	ULS SLS	—	1.0 0.8	1.3 1.0	
	Temperature gradient		4.5.8	ULS SLS	—	0.8 0.6	1.0 0.8	
	Frictional bearing restraint	F _{br}	4.1.1.2	ULS SLS	—	—	1.3 1.0	

TABLE 17 Combinations of nominal actions F_k and partial action factors γ_f.
Values for γ_f are given in Part 3.

Automatic Generation of Load Combinations

Option
Add Replace

Code Selection
Steel Concrete SRC Steel Composite

Design Code TMH07-1981

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

ST - Static Load Case CS - Construction Stage

Code Based User Defined

Load Factors for Permanent Loads

Dead Load 1.25 1.05 Both

Super Imposed DL 1.25 1.05 Both

Vertical Earth Pressure Method-1

Non-Vertical Earth Pressure Approximate

Earth Pressure Relieving 0.5

Partial Safety Factor for Moving Load, Surcharge Load

Load Case NA

Vehicle Type NA

TMH07 Vehicle Load Factor Table

Load Co. Vehicle Type

Add Delete

Longitudinal Braking & Traction

Load Case

Load Factor 1.25

Load Case Factor

Add Delete

Partial Load Factor for Inaccurate Load Effect

For Ultimate Limit State 1.10

For Service Limit State 1.00

Consider Orthogonal Effect (100 : 30 Rule)

Set Load Cases for Orthogonal Effect...

OK Cancel

Serviceability Load Combination Type

Serviceability

Combination 1
cLCB533
cLCB534

Combination 2 and 3
cLCB535
cLCB536
cLCB537
cLCB538
cLCB539
cLCB540
cLCB541
cLCB542
cLCB543
cLCB544
cLCB545
cLCB546
cLCB547
cLCB548

OK Cancel

Auto Load Combination

SLS Load combination Type

10. PSC Design as per TMH07-3 : 1989

- The design of PSC elements as per TMH07-3:1989 has been newly implemented in MIDAS.
- This feature can be applied to all the PSC girder.

Design > PSC Design > TMH07-3 : 1989

PSC Design Code

Design Code

TMH07-3:1989

Input Parameters

User Input Data

Modify Design Parameters...

Principal Stress Limitation

Serviceability Limit States

Comp.

0

kN/m²

Tens.

0

kN/m²

Construction Stage

Comp.

0

kN/m²

Tens.

0

kN/m²

Output Parameters

Serviceability Limit States

☒ Concrete stress limitation under service loads

☒ Concrete stress limitation at Construction Stage

☒ Principal stress under service loads

☒ Principal stress at Construction Stage

☒ Tensile stress for prestressing steel

Ultimate limit states

☒ Bending resistance

☒ Shear resistance

☒ Torsional resistance

Select All

Unselect All

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	AD	AE	AF	AG	AH											
2 Shear Design for a Section																																												
- Strength limit load combination :														trial																														
- Strength limit load combination type :														-																														
- Axial force due to ultimate loads														P =	0.00 (kN)																													
- Shear force due to ultimate loads														V =	0.00 (kN)																													
- Bending moment due to ultimate loads														M =	36750.01 (kN m)																													
1) Crack Check for Flexure																																												
- Cracking moment (M _{cr})														(see Clause 4.3.4.3 - TMH7-3 : 1989)																														
$M_{cr} = (0.37\sqrt{f_{cu}} + f_{pt}) \times \frac{I}{y}$														= 11246.70 (kN m)																														
where,																																												
f _{pt} = 0.02 (MPa)														: Stress due to prestress only at the tensile fibre																														
I = 9.5410E+12 (mm ⁴)														: Second moment of area																														
y = 2001.44 (mm)														: Tensile fibre distance																														
Y _{FL} = 1.15																																												
Since,																																												
M _{cr} ≤ M														: Section is cracked in flexure																														
2) Shear resistance of Concrete																																												
• Ultimate Shear Resistance of Concrete (V _{cr}).														(Clause 4.3.4.3 (Eq-34) - TMH7-3 : 1989)																														
$V_{cr} = 0.037bd\sqrt{f_{cu}} + \frac{M_p}{M} y + 0.5 \cdot V_p \cdot \gamma_{fl} \geq 0.1bd\sqrt{f_{cu}}$																																												
= 294.29 ≥														704.99 ∴ V _{cr} = 704.99 (kN)																														

PSC Design

Detailed Excel Report

MIDAS

20

11. Significantly Improved Excel Design Report Generation Speed

- The generation speed of Excel-based design reports has been dramatically improved by adopting the LibXL library. This enhancement reduces the time required to export large and complex design calculation sheets.
- **Key Improvements** : Significantly faster export performance for design reports.
Improved stability when generating large files.
- This update enhances user productivity, especially for projects requiring frequent report generation and documentation submission.

Design > Steel Design ,RC Design , PSC Design , Composite Design

Applicable to the following design codes:

PSC/PSC Composite

AASHTO-LRFD20
AS 5100.5:17
BS 5400-4:1990
CSA-S6-14
CSA-S6-19
CSA-S6S1-10
KSCE-LSD15
KDS 24 14 21 : 2021
TMH07
Eurocode2-2:05
IRC112, IRS
BD44/15 for CS455, CS457
SNiP 2.05.03-84*
SP 35.13330.2011

Steel Composite

AASHTO-LRFD20
CSA-S6-14
CSA-S6-19
SNiP 2.05.03-84*
SP 35.13330.2011
EN 1994-2
KSCE-LSD15
KDS 24 14 31 : 2018

Steel SOD

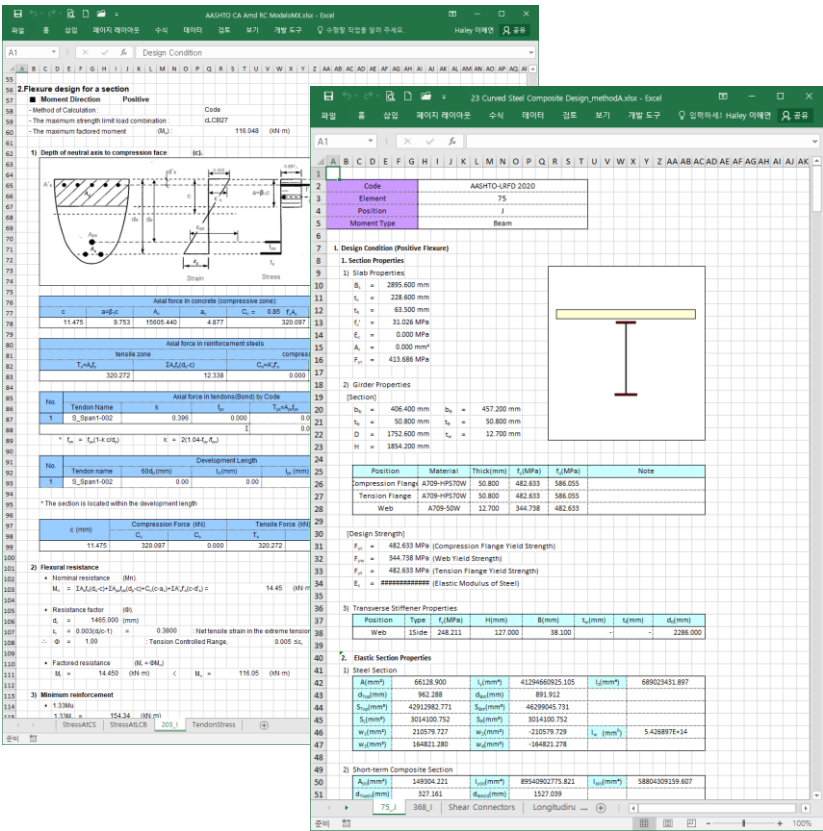
SNiP 2.05.03-84*
SP 35.13330.2011

Steel Rating

AASHTO-LRFR11
AASHTO-LRFR19
CS454/20
NR GN CIV 025

PSC Rating

AASHTO-LRFR11
AASHTO-LRFR19
CS454/20
KSCE-LSD15



Excel Report

12. Moving patch load analysis as per Eurocode, BS & NZ traffic loads

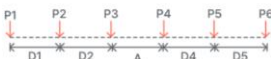
- The tire contact area of a wheel can now be applied during moving load analysis not only for AASHTO LRFD vehicles (as in previous versions), but also for all road bridge vehicles defined in Eurocode, BS and New Zealand standards.
- By applying patch (area) loads instead of concentrated wheel loads, the resulting design forces on plate elements can be significantly reduced, leading to more realistic and optimized analysis results. This enhancement improves modeling accuracy, especially for deck and slab structures where local stress distribution is critical.

▪ **Load > Moving Load (AASHTO LRFD) > Vehicles**

Define Standard Vehicular Load

Standard Name
CS 458 (BD96/11) Special Load

Vehicular Load Properties
Vehicular Load Name
SV 80
Vehicular Load Type
SV 80



* SV 80

No	P (kN)	D (m)
1	130	1.2
2	130	1.2
3	130	A
4	130	1.2
5	130	1.2
6	130	end

No	P (kN)	D (m)
----	--------	-------

A is Critical of 1.2m or 5.0m or 9.0m

☒ Dynamic Amplification Factor

☒ Auto ☐ User Input

ψ : 1

☒ Overload Factor

☒ Auto ☐ User Input

Critical Axle 1.2

All Other Axles 1.1

Distance to Front and Rear Vehicles

☒ 25m ☐ 5m

☒ Consider Contact Area

Width 0.35 m

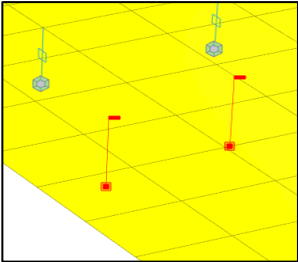
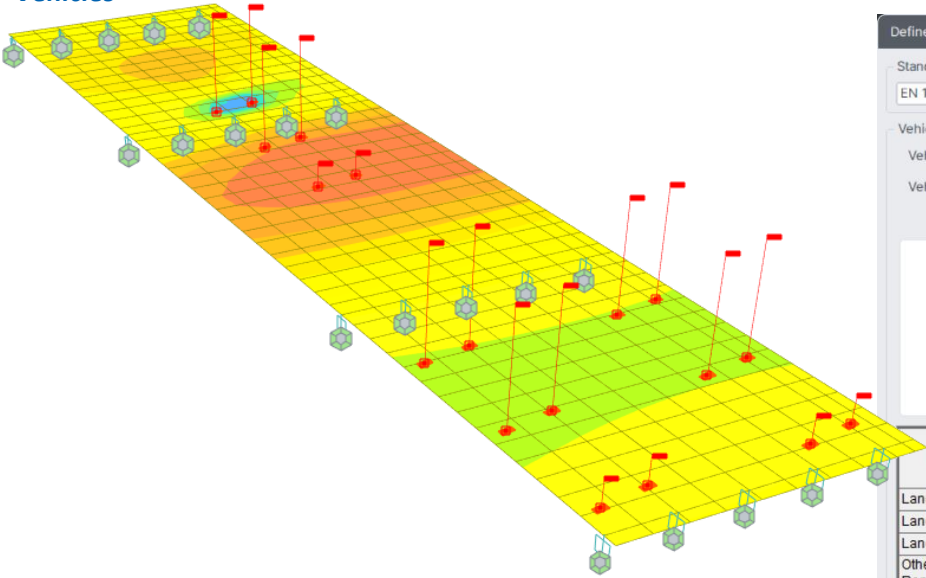
Length 0.35 m

OK

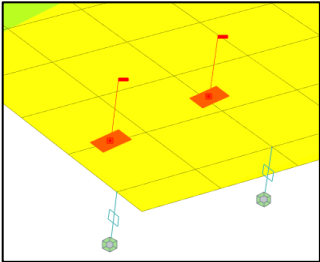
Cancel

Apply

BS Special Vehicle



Concentrated wheel loads

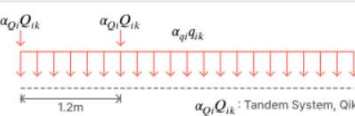


Patch/area wheel loads

Define Standard Vehicular Load

Standard Name
EN 1991-2:2003 - RoadBridge

Vehicular Load Properties
Vehicular Load Name
Load Model 1
Vehicular Load Type
Load Model 1



Tandem System

Location	Adjustment Factor	Axle Loads (kN)
Lane Number1	1	300
Lane Number2	1	200
Lane Number3	1	100
Other Lanes & Remaining Area	0	0

UDL System

Location	Adjustment Factor	Uniformly Dist. Loads (kN/m²)
Lane Number1	1	9
Lane Number2	1	2.5
Lane Number3	1	2.5
Other Lanes & Remaining Area	1	2.5

ψ factor for Tandem System 0.75

ψ factor for UDL System 0.4

☒ Consider Contact Area

Width 0.4 m

Length 0.4 m

OK

Cancel

Apply

Eurocode Load Model1 Vehicle

13. Addition of evaluation truck loads for existing bridges in New Zealand(Based on SP/M/022 v3.4)

- A full set of New Zealand vehicle load models, as specified in SP/M/022 v3.4, has been added, including: HN (normal) loading, HO (overload) loading, TT530 (Fatigue), HPMV evaluation loading, General access and 50MAX reference vehicles
- This enhancement is integrated with the lane optimization feature and the patch load (tire contact area) function for improved load distribution on deck elements.
- Users can define the target element and span length, and the Dynamic Factor is automatically calculated and applied in the analysis, ensuring more accurate simulation of vehicle effects on bridge structures.

▪ **Load > Moving Load > New Zealand**

Define Standard Vehicular Load

Standard Name

Traffic Load

General Access Vehicle
50MAX Conforming Vehicle
High Productivity Motor Vehicle
Deck Evaluation Vehicle
Fatigue Loading Model

W

P1

P2

K

D1

No	Load(kN)	Spacing(m)
1	120	5
2	120	end

W

10.5

kN/m

Consider Contact Area

Width

0.5

m

Length

0.2

m

OK

Cancel

Apply

New Zealand Vehicles

Dynamic Load Factor

Select Structure Group

SG-P2Seg12

SG-KeySeg1

SG-KeySeg2

SG-KeySeg3

SG-FSM1

SG-FSM2

BG-S-Pier

BG-S-FsmLeft

BG-S-FsmRight

BG-EL-Pier

BG-EL-FsmLeft

BG-EL-FsmRight

Dynamic Factor Input Type

Auto Input

User Input

Auto Calculation

Span Length

80

m

Bending and Shear for Beam Element

Auto

Reaction

Auto

All Other Effects

1

(e.g.Axial, Torsion, Stress, Displacements, etc)

Span ID	Group List	Length	Other
1	SG-P1Seg1, SG-P1S...	80	1

Add

Modify

Insert

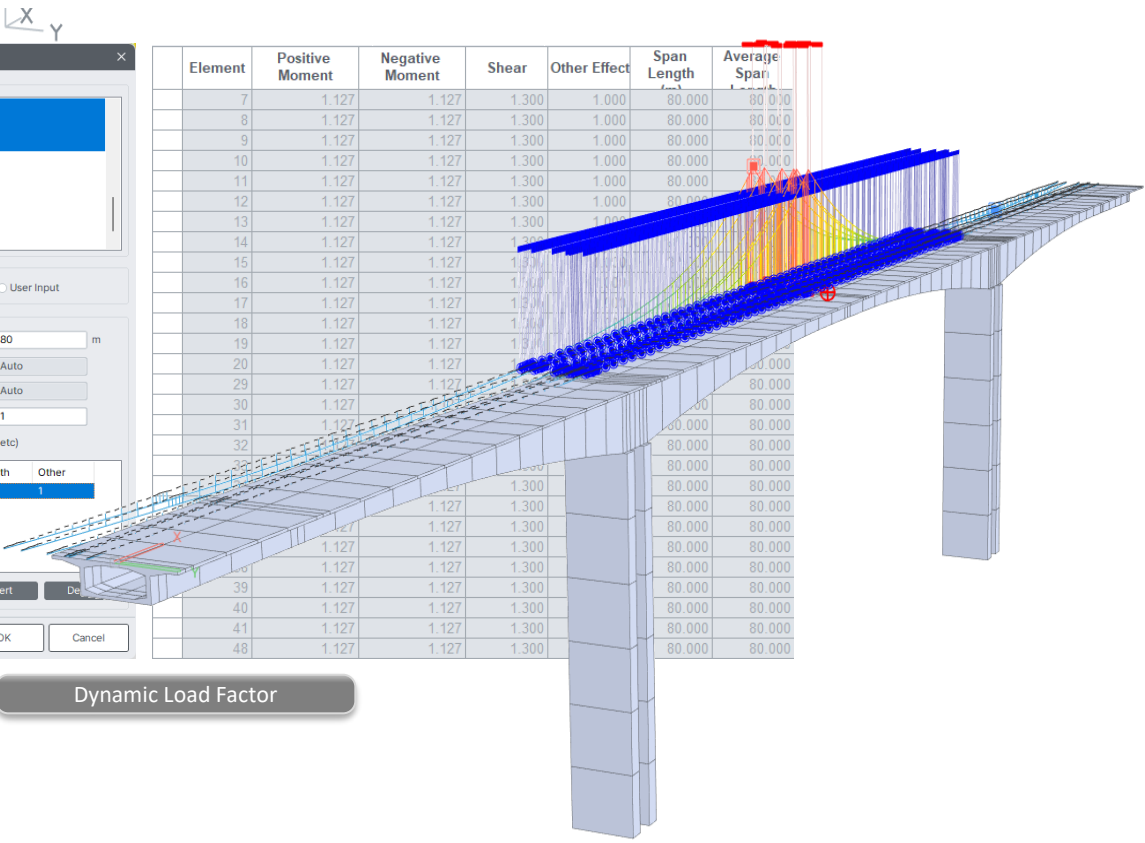
Delete

OK

Cancel

Dynamic Load Factor

Element	Positive Moment	Negative Moment	Shear	Other Effect	Span Length (m)	Average Span Length (m)
7	1.127	1.127	1.300	1.000	80.000	80.000
8	1.127	1.127	1.300	1.000	80.000	80.000
9	1.127	1.127	1.300	1.000	80.000	80.000
10	1.127	1.127	1.300	1.000	80.000	80.000
11	1.127	1.127	1.300	1.000	80.000	80.000
12	1.127	1.127	1.300	1.000	80.000	80.000
13	1.127	1.127	1.300	1.000	80.000	80.000
14	1.127	1.127	1.300	1.000	80.000	80.000
15	1.127	1.127	1.300	1.000	80.000	80.000
16	1.127	1.127	1.300	1.000	80.000	80.000
17	1.127	1.127	1.300	1.000	80.000	80.000
18	1.127	1.127	1.300	1.000	80.000	80.000
19	1.127	1.127	1.300	1.000	80.000	80.000
20	1.127	1.127	1.300	1.000	80.000	80.000
29	1.127	1.127	1.300	1.000	80.000	80.000
30	1.127	1.127	1.300	1.000	80.000	80.000
31	1.127	1.127	1.300	1.000	80.000	80.000
32	1.127	1.127	1.300	1.000	80.000	80.000
33	1.127	1.127	1.300	1.000	80.000	80.000
34	1.127	1.127	1.300	1.000	80.000	80.000
35	1.127	1.127	1.300	1.000	80.000	80.000
36	1.127	1.127	1.300	1.000	80.000	80.000
37	1.127	1.127	1.300	1.000	80.000	80.000
38	1.127	1.127	1.300	1.000	80.000	80.000
39	1.127	1.127	1.300	1.000	80.000	80.000
40	1.127	1.127	1.300	1.000	80.000	80.000
41	1.127	1.127	1.300	1.000	80.000	80.000
48	1.127	1.127	1.300	1.000	80.000	80.000



14. Addition of special permit trucks for load rating of existing bridges in Western Australia

- The latest version of MIDAS CIVIL NX includes a newly added vehicle database for Western Australia (WA) to support region-specific bridge assessments.
- Group 1 and Group 2 vehicles can be selected while optionally enabling Multiple Lane Factors and Accompanying Lane Factors. Group2 vehicles are fully compatible with SM1600 vehicle configurations.
- This enhancement provides improved flexibility and regulatory compliance for bridge evaluations in Western Australia.

▪ Load > Moving Load > Australia

Define Standard Vehicular Load

Standard Name

AS 5100.7 - Rating Vehicles

Vehicular Load Properties

Vehicular Load Name

WA-Group1-Vehicle1

Vehicular Load Type

WA-Group1-Vehicle1

Dynamic Load Allowance

0.4

P1

P2

P3

P4

P5

D1

D2

D3

D4

No	Load(tonf)	Spacing(m)
1	6	4.9
2	9	1.2
3	9	7.25
4	9	1.2
5	9	end

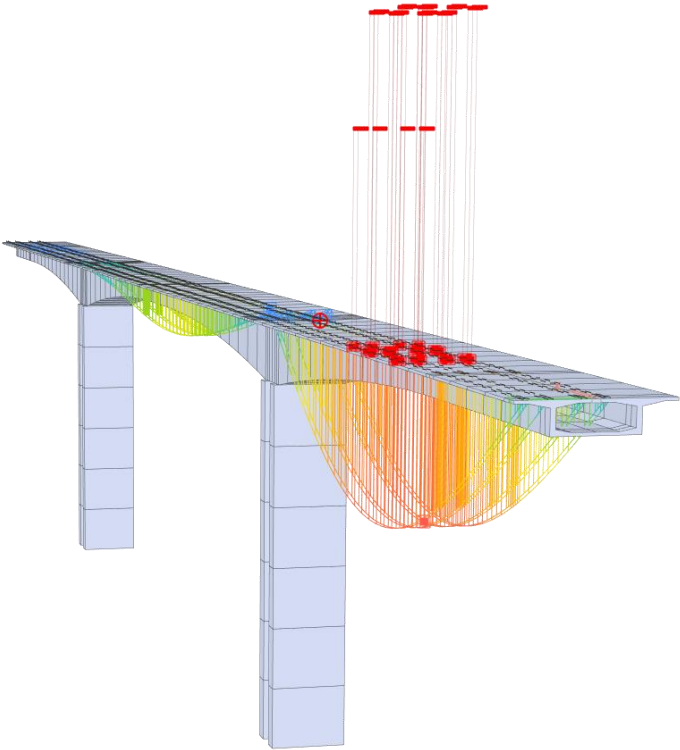
OK

Cancel

Apply

- T44 Truck Load
- L44 Lane Load
- 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
- WA-Group1-Vehicle1**
- WA-Group1-Vehicle2
- WA-Group1-Vehicle3
- WA-Group1-Vehicle4
- WA-Group2-Vehicle1 (3.01m O/A)
- WA-Group2-Vehicle1 (3.70m O/A)
- WA-Group2-Vehicle2 (3.01m O/A)
- WA-Group2-Vehicle2 (3.70m O/A)
- WA-Group2-Vehicle4
- WA-Group2-Vehicle5
- WA-Group2-Vehicle7
- WA-Group2-Vehicle8

Western Australia Vehicles



Define Moving Load Case

Load Case Name

Lane

Description

☐ Load Case for Permit Vehicle

☒ Moving Load Optimization

☐ Select Load Model

General

Fatigue

Heavy Load Platform

Rail Traffic Load

B-Double Load

☒ WA Rating Vehicle Group1

☐ WA Rating Vehicle Group2

Multiple Lane Factor

Accompanying Lane Factor

Num of Loaded Lanes

Scale Factor

1

1

2

0.8

3 or more

0.4

Optimization

Min. Vehicle Distance

1

m

Load Case Data

Loaded Lane

Lane

Min. Number of Vehicle

0

Max. Number of Vehicle

2

Loading Effect

☐ Combined

☒ Independent

Assignment Vehicle

Selected Vehicle

VLWA-Group1-Vehi

Scale Factor

1.0

Vehicle	Scale
VLWA-Group1-Vehicle1	1

Add

Modify

Delete

OK

Cancel

Apply

Moving Load Cases

15. Enhancement of Australian moving load options: Add lateral offset distance option

- When performing moving load analysis for Heavy Load Platform (HLP) vehicles under AS 5100.2 or WA Group 2 vehicles under AS 5100.7, it is important to evaluate the critical vehicle position considering lateral eccentricity. In previous versions, lateral eccentricity was fixed at 1.0 m during vehicle placement. With this update, users can now manually define lateral eccentricity up to 1.0 m, allowing for more accurate and flexible simulation of critical load positions.
- Benefits :** Improves accuracy in rating calculations by reflecting realistic vehicle positioning.
Enables detailed control of vehicle eccentricity in accordance with project-specific requirements.
Enhances compliance with AS 5100.2 and AS 5100.7 practices.
- This feature provides more robust control for heavy vehicle evaluation, especially in rating scenarios involving wide bridges or straddling lanes.

▪ **Load > Moving Load > Australia**

Define Standard Vehicular Load

Standard Name

AS 5100.2 - Heavy Load Platform

Vehicular Load Properties

Vehicular Load Name

HLP320

Vehicular Load Type

HLP320

Dynamic Load Allowance

0.1

Lateral Eccentricity

1

m

P

P

D

D

P

P

D

D

P = 200 kN

D = 1.8 m

Number of Axles = 16

OK

Cancel

Apply

Heavy Load Platform

Define Standard Vehicular Load

Standard Name

AS 5100.7 - Rating Vehicles

Vehicular Load Properties

Vehicular Load Name

WA-Group2-Vehicle1 (3.01m O/A)

Vehicular Load Type

WA-Group2-Vehicle1 (3.01m O/A)

Dynamic Load Allowance

0.1

Lateral Eccentricity

1

m

P1

P2

P3

P4

P5

P6

P7

P8

D1

D2

D3

D4

D5

D6

D7

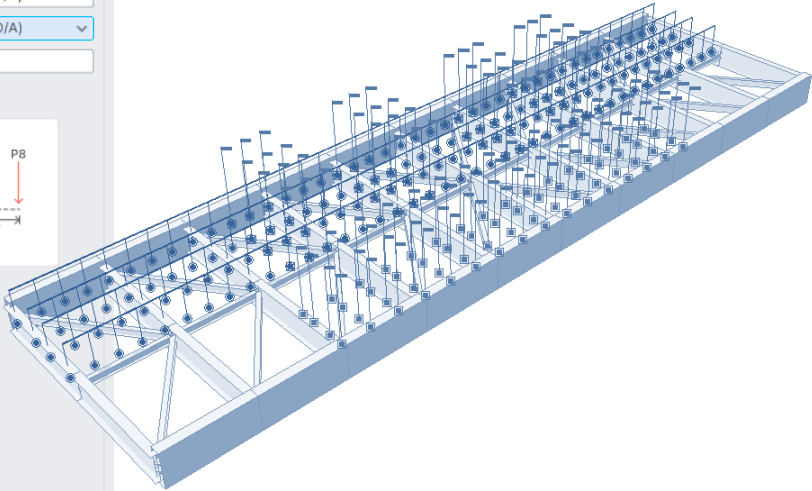
No	Load(kN)	Spacing(m)
1	58.8399	4.9
2	88.2598	1.2
3	88.2598	3
4	176.52	1.2
5	176.52	6.5
6	176.52	1.8
7	176.52	1.8
8	176.52	end

OK

Cancel

Apply

WA Rating Vehicles



16. Enhancement of Load All Model 1 in the UK rating system to support envelope type loads

- The UK rating system has been enhanced to support Vehicle Class functionality for BS moving loads, including All Model 1 as per CS454.
- Previously, reviewing All Model 1 required checking results for over 20 different vehicles individually, which was time-consuming. With the new Vehicle Class feature, users can now define a single moving load case that automatically evaluates all vehicles in the class and returns results for the most critical vehicle.
- This significantly improves efficiency by: Reducing setup and post-processing time, Automatically identifying governing cases, Enabling envelope-type load evaluations in a single step. This update streamlines the BS-based assessment process and enhances productivity, especially for complex rating projects.

▪ **Load > Moving Load > BS**

Define Standard Vehicular Load

Standard Name

CS 454 Assessment

Vehicular Load Properties

Vehicular Load Name

A-4AXLE

Vehicular Load Type

ALL MODEL 1

Sub Type

A-4AXLE

O1

D1

D

P1

P2

A-4AXLE

B-4AXLE

C-5AXLE

D-5AXLE_1

D-5AXLE_2

E-5AXLE_1

E-5AXLE_2

F-6AXLE_1

F-6AXLE_2

G-6AXLE_1

G-6AXLE_2

H-5AXLE_1

H-5AXLE_2

I-3AXLE

J-3AXLE

K-3AXLE_1

K-3AXLE_2

L-3AXLE_1

L-3AXLE_2

M-2AXLE

N-2AXLE

O-2AXLE

* A-4AXLE

No	P (kN)	D (m)
1	64	1.2
2	64	3.9
3	113	1.3
4	74	end

Loading Case

Single

Convoy

Road Surface

Good

Poor

Traffic Flow Category

High

Medium

Low

Consider Contact Area

Width

0.3

m

Length

0.3

m

OK

Cancel

Apply

Define Moving Load Case

Load Case Name

All Model1 Env

Description

Moving Load Optimization

Select Load Model

Standard Load (BD 37/01, BS 5400)

Special Load (BD 86/11)

CS 454 Assessment (ALL Model 1, Special Load)

CS 454 Assessment (ALL Model 2, Special Load)

NR GN CIV 025 (Network Rail)

Auto Live Load Combination

Type of Design Combination Factor

Ultimate Limit State

Serviceability Limit State

Combination of Loads

Combination 1

Combination 2 or 3

Load Case Data

Standard Load

VC:Class1

Special Load

SV 80

Assignment Lanes

Line of Lanes

Lane 4

Lane 3

Lane 2

Lane 1

Selected Lanes

Lane 2 : Lane

Lane 3 : Lane

Lane 4 : Lane

Straddling Lanes

Remaining Area

OK

Cancel

Apply

Vehicle Class Data

Vehicle Class Name

Class1

Vehicle Load

Selected Load

A-4AXLE

B-4AXLE

C-5AXLE

D-5AXLE_1

D-5AXLE_2

E-5AXLE_1

E-5AXLE_2

F-6AXLE_1

G-6AXLE_1

H-5AXLE_1

H-5AXLE_2

OK

Cancel

Apply

All Model1 Vehicles

Moving Load Case

Vehicle Class

MIDAS

26

17. Addition of vehicle database for 46 US states

- In previous versions, MIDAS CIVIL NX provided AASHTO LRFD vehicle databases for only 10 states, including California. With this update, the database has been expanded to cover all 46 U.S. states that follow the AASHTO LRFD specification.
- Key Additions: State-specific Design Trucks, Legal Trucks, and Permit Trucks are now included for each state.
- This enhancement allows users to perform more accurate and regionally compliant bridge load rating and design across a wide range of jurisdictions in the United States.

▪ Load > Moving Load > AASHTO LRFD

Define Standard Vehicular Load

Standard Name

AASHTO LRFD Load

AASHTO Standard Load

AASHTO Legal/Permit Load

IADOT Load

ILDOT Load

LADOT Load

MODOT Load

OHDOT Load

RIDOT Load

VADOT Load

WIDOT Load

INDOT Load

Fast Act EV Loads

Caltrans Standard Load (2017_draft)

Caltrans Standard Load

Turkey

Colombia

Others

Lane Support-Neg. Moment / Reaction

Application

Not assigned

a

Assigned

a,b

No

Load(kN)

Spacing(m)

W

9.3401007

kN/m

r

90

%

Dist.

15.24

m

☐ Consider Contact Area

Width

0.508

m

Length

0.254

m

☐ Add Centrifugal Force

OK

Cancel

Apply

CIVIL NX 2025 (v1.1)

Define Standard Vehicular Load

Standard Name

AASHTO LRFD Load

AASHTO Standard Load

AASHTO Legal/Permit Load

Alaska

Alabama

Arizona

Arkansas

California

Colorado

Connecticut

District of Columbia

Delaware

Florida

Georgia

Hawaii

Iowa

Idaho

Illinois

Indiana

Kansas

Kentucky

Louisiana

Massachusetts

Maryland

Maine

Michigan Normal Loading

Michigan Designed loading

Michigan Special Designed loading

Minnesota

Missouri

Mississippi

North Dakota

Nebraska

Nevada

New Jersey

New Mexico

New York

Ohio

Oklahoma

Oregon

Rhode Island

South Carolina

South Dakota

Tennessee

Texas

Utah

Virginia

Vermont

Washington

Wisconsin

West Virginia

Fast Act EV Loads

Caltrans Standard Load (2017_draft)

Caltrans Standard Load

Turkey

Colombia

Others

Define User Defined Vehicular Load

Load Type

☐ Truck/Lane

☐ Legal Load

☐ Train Load

☒ Permit Truck

Vehicular Load Properties

Vehicular Load Name

Impact Factor

0

Center of Vehicle

Center of Ref. Lane

Type of Axle

Name

a1

Add

a2

Modify

Delete

☐ Evenly Distributed Wheel Load

☒ Symmetric Vehicle

	P1	D1	P2	D2	P3	D3	P4	D4	P5	D
	55.60	0.952								

	Type of Axle	VS	Spacing (m)	P1 (kN)	D1 (m)	P2 (kN)	D2 (m)	P3 (kN)	D3 (m)
1	a1	☐	3.35	55.60	0.95				
2	a2	☐	1.22	62.28	1.07				
3	a2	☐	1.22	62.28	1.07				
4	a2	☐	end	62.28	1.07				
5		☐							

Iowa

IADOT-SPV-Type 4

User Defined

Caltrans Standard Load (2017_draft)

Caltrans Standard Load

IRC:6 Standard Load

Iowa

Alaska

Kansas

Missouri

OK

Cancel

Apply

CIVIL NX 2025 (v2.1)

Moving Load Cases

18. Addition of cross-section databases for the US and Canada

- The section database has been significantly expanded to support regional standards in the U.S. and Canada, enhancing modeling accuracy and design efficiency. These additions provide engineers with ready-to-use section profiles that comply with local specifications, streamlining design workflows for North American bridge projects.
- Canada : Added steel section database according to CISC-ICCA 2022, including : Angle, Channel, I-section, T-section, Box, Pipe, and Double Angle profiles.
Added 12 PSC sections used in Ontario, including : PSC I-girders and PSC Box-girders.
- United States – Florida : Added 41 prestressed concrete (PSC) sections based on Florida Department of Transportation (FDOT) standards, covering : PSC I-Girders, PSC U-Girders, Interior & Exterior Slab Beams, PSC Pile (Square Sections)

Properties > Section Properties

Section Data

PSC

Tapered

Composite

Steel Girder

DB/User

Value

SRC

Combined

Section ID 1

I-Section

Name HP410x211

User

DB

CISC(SST12)

Sect. Name HP410x211

Built-Up Section

Get Data from Single Angle

DB Name AISC10(US)

Sect. Name

H 0.406 m

B1 0.406 m

tw 0.0222 m

tf1 0.0222 m

B2 0 m

tf2 0 m

r1 0 m

r2 0 m

Offset: Center-Center

Consider Shear Deformation.

Change Offset ...

Consider Warping Effect(7th DOF)

Show Calculation Results...

OK

Cancel

Apply

Canada CISC Steel DB sections

Select PSC DB

Code Canada

Type Ontario

Select DB

1:B700

2:B800

3:B900

4:B1000

5:NU900

6:NU1200

7:NU1400

8:NU1600

9:NU1800

10:NU1900

11:NU2000

12:NU2400

OK

Cancel

Canada Ontario PSC DB Sections

Select PSC DB

Code USA

Type FDOT

Select DB

1:I 36 Beam

2:I 45 Beam

3:I 54 Beam

4:I 63 Beam

5:I 72 Beam

6:I 78 Beam

7:I 84 Beam

8:I 96 Beam

9:ExtL Slab Beam 4.5ft x 12in

10:ExtL Slab Beam 4.5ft x 15in

11:ExtL Slab Beam 4.5ft x 18in

12:ExtL Slab Beam 4ft x 12in

13:ExtL Slab Beam 4ft x 15in

14:ExtL Slab Beam 4ft x 18in

OK

Cancel

Florida-I 36 Beam - Standard Details
Florida-I 45 Beam - Standard Details
Florida-I 54 Beam - Standard Details
Florida-I 63 Beam - Standard Details
Florida-I 72 Beam - Standard Details
Florida-I 78 Beam - Standard Details
Florida-I 84 Beam - Standard Details
Florida-I 96 Beam - Standard Details
AASHTO Type II Beam
Florida-U 48 Beam - Standard Details
Florida-U 54 Beam - Standard Details
Florida-U 63 Beam - Standard Details
Florida-U 72 Beam - Standard Details
12" Florida Slab Beam
15" Florida Slab Beam
18" Florida Slab Beam

USA Florida PSC DB Sections

19. Batch output for tendon loss table by construction stage and tendon group

- In previous versions, users could view tendon loss results for only one tendon group and one construction stage at a time.
- With this update, the result table now supports multi-selection of both tendon groups and construction stages, allowing users to review multiple results simultaneously.
- **Benefits** : Streamlines the process of reviewing and comparing tendon losses across various groups and stages.
Significantly improves efficiency when generating reports or summarizing results, eliminating the need to check tendon data one by one.
Results for all selected items are displayed together in a single integrated table.

Results > Result Tables > Tendon > Tendon Loss

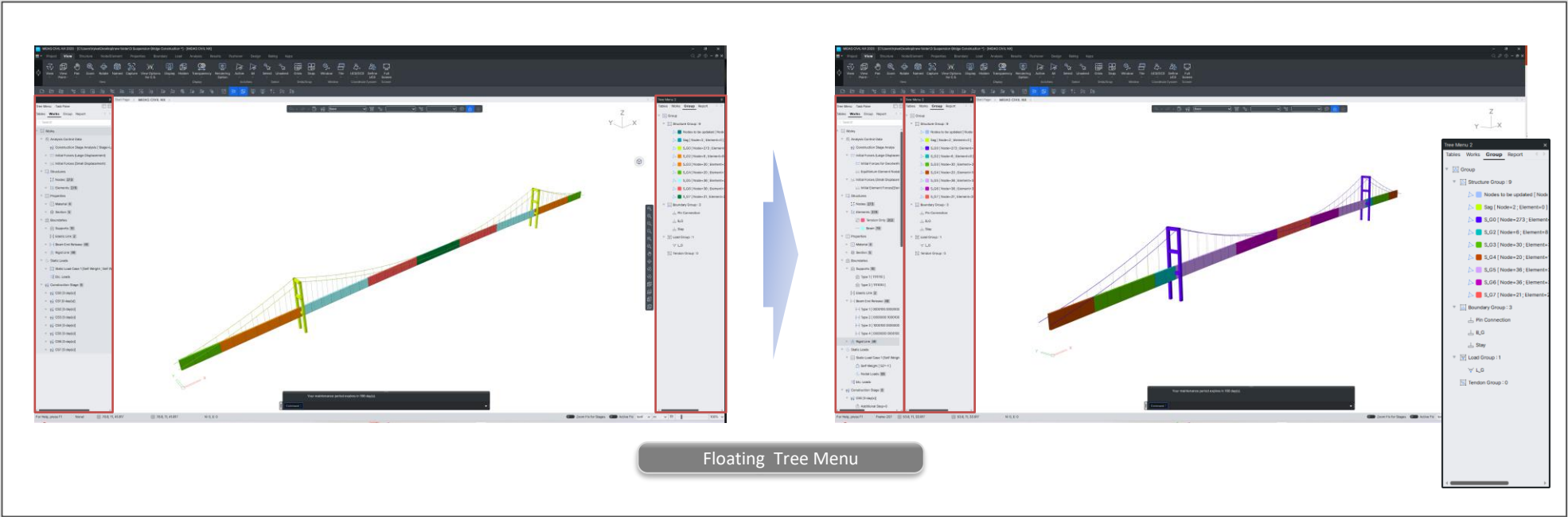
Start Page > MIDAS CIVIL NX > Result - [Tendon Loss (Tendon Group)]									
Elem	Part	Stress (After Immediate Loss) - A (N/mm²)	Elastic Deform. Loss - B (N/mm²)	Stress(Elastic Loss/ Stress(Immediate Loss))	Creep/Shrinkage Loss (N/mm²)	Relaxation Loss (N/mm²)	Stress(After All Losses/ Stress(After Immediate Loss))	Effective Num.	
The Loss of tendon group [Tendon-Span1] at the stage of [Stage2]									
		Tendon-Span1	Stage2	Apply					
90	I	601261.7614	3461.4555	Stage2	0.0000	0.0000	1.0058	44.0000	
90	J	601261.7614	5870.3434	Stage3-1	0.0000	0.0000	1.0096	44.0000	
91	I	601261.7614	1441.4978	Stage2	0.0000	0.0000	1.0024	44.0000	
91	J	601261.7614	13877.0406	Stage4	0.0000	0.0000	1.0231	44.0000	
92	I	601261.7614	13877.0406	Stage5	0.0000	0.0000	1.0231	44.0000	
92	J	601261.7614	27214.1713		1.0453	0.0000	1.0453	44.0000	
93	I	601261.7614	27214.1713		1.0453	0.0000	1.0453	44.0000	
93	J	601261.7614	29714.8786		1.0494	0.0000	1.0494	44.0000	
94	I	601261.7614	29714.8786		1.0494	0.0000	1.0494	44.0000	
94	J	601261.7614	39148.4665		1.0651	0.0000	1.0651	44.0000	
95	I	601261.7614	39148.4665		1.0651	0.0000	1.0651	44.0000	
95	J	601261.7614	49679.9261		1.0826	0.0000	1.0826	44.0000	
96	I	601261.7614	49679.9261		1.0826	0.0000	1.0826	44.0000	
96	J	601261.7614	53502.1487		1.0890	0.0000	1.0890	44.0000	
97	I	601261.7614	53502.1487		1.0890	0.0000	1.0890	44.0000	
97	J	601261.7614	58808.5502		1.0978	0.0000	1.0978	44.0000	
98	I	601261.7614	58808.5502		1.0978	0.0000	1.0978	44.0000	
98	J	601261.7614	66534.3387		1.1107	0.0000	1.1107	44.0000	
99	I	601261.7614	66534.3387		1.1107	0.0000	1.1107	44.0000	
99	J	601261.7614	70494.8280		1.1172	0.0000	1.1172	44.0000	
100	I	601261.7614	70494.8280		1.1172	0.0000	1.1172	44.0000	
100	J	601261.7614	72857.2917		1.1212	0.0000	1.1212	44.0000	
101	I	601261.7614	72857.2917		1.1212	0.0000	1.1212	44.0000	
101	J	601261.7614	77777.4092		1.1294	0.0000	1.1294	44.0000	
102	I	601261.7614	77777.4092		1.1294	0.0000	1.1294	44.0000	
102	J	601261.7614	80703.6552		1.1342	0.0000	1.1342	44.0000	
103	I	601261.7614	80703.6552		1.1342	0.0000	1.1342	44.0000	
103	J	601261.7614	81294.6911		1.1352	0.0000	1.1352	44.0000	
104	I	601261.7614	81294.6911		1.1352	0.0000	1.1352	44.0000	
104	J	601261.7614	83409.1375		1.1387	0.0000	1.1387	44.0000	
105	I	601261.7614	83409.1375		1.1387	0.0000	1.1387	44.0000	
105	J	601261.7614	84120.0581		1.1399	0.0000	1.1399	44.0000	
106	I	601261.7614	86961.0733		1.1447	0.0000	1.1447	44.0000	
106	J	601261.7614	86956.4939		1.1446	0.0000	1.1446	44.0000	
107	I	601261.7614	86956.4939		1.1446	0.0000	1.1446	44.0000	
107	J	601261.7614	85251.8262		1.1418	0.0000	1.1418	44.0000	
108	I	601261.7614	85251.8262		1.1418	0.0000	1.1418	44.0000	
108	J	601261.7614	82144.3229		1.1366	0.0000	1.1366	44.0000	
109	I	601261.7614	82144.3229		1.1366	0.0000	1.1366	44.0000	
109	J	601261.7614	81353.9453		1.1353	0.0000	1.1353	44.0000	
110	I	601261.7614	81353.9453		1.1353	0.0000	1.1353	44.0000	
110	J	601261.7614	77633.9641		1.1291	0.0000	1.1291	44.0000	
111	I	601261.7614	77633.9641		1.1291	0.0000	1.1291	44.0000	
111	J	601261.7614	71720.8097		1.1193	0.0000	1.1193	44.0000	
112	I	601261.7614	71720.8097		1.1193	0.0000	1.1193	44.0000	
112	J	601261.7614	68960.8626		1.1147	0.0000	1.1147	44.0000	
113	I	601261.7614	68960.8626		1.1147	0.0000	1.1147	44.0000	
113	J	601261.7614	64404.7998		1.1071	0.0000	1.1071	44.0000	
114	I	601261.7614	64404.7998		1.1071	0.0000	1.1071	44.0000	

CIVIL NX 2025 (v1.1)

Start Page > MIDAS CIVIL NX > Result - [Tendon Loss (Tendon Group)]									
Tendon Group	Stage	Elem	Part	Stress (After Immediate Loss) - A (N/mm²)	Elastic Deform. Loss - B (N/mm²)	Stress(Elastic Loss/Stress(Immediate Loss))	Creep/Shrinkage Loss (N/mm²)	Relaxation Loss (N/mm²)	Effective Num.
Tendon-Span1	Stage2	691.0000	I	1.0067	-43813.6287	-16882.8073	0.9582	1.0000	1.0000
Tendon-Span1	Stage2	691.0000	J	1.0077	-43523.2191	-16755.9957	0.9596	1.0000	1.0000
Tendon-Span1	Stage2	482.0000	I	1.0049	-44768.9615	-19537.9068	0.9557	1.0000	1.0000
Tendon-Span1	Stage2	482.0000	J	1.0037	-45350.8002	-19451.2183	0.9542	1.0000	1.0000
Tendon-Span1	Stage2	697.0000	I	1.0091	-42569.1626	-18868.2434	0.9615	1.0000	1.0000
Tendon-Span1	Stage2	697.0000	J	1.0087	-42781.8576	-18836.4456	0.9609	1.0000	1.0000
Tendon-Span1	Stage2	137.0000	I	1.0066	-43765.9623	-18676.2854	0.9582	1.0000	1.0000
Tendon-Span1	Stage2	137.0000	J	1.0075	-43304.7568	-18742.2595	0.9593	1.0000	1.0000
Tendon-Span1	Stage2	143.0000	I	1.0092	-42376.2314	-18667.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	143.0000	J	1.0089	-42519.1993	-18647.2049	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	149.0000	I	1.0049	-44607.3267	-18542.3682	0.9559	1.0000	1.0000
Tendon-Span1	Stage2	149.0000	J	1.0037	-45249.5599	-18448.7618	0.9543	1.0000	1.0000
Tendon-Span1	Stage2	274.0000	I	1.0058	-42103.7026	-18619.2372	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	274.0000	J	1.0067	-41681.6287	-18482.8073	0.9582	1.0000	1.0000
Tendon-Span1	Stage2	280.0000	J	1.0077	-41259.2191	-18355.9957	0.9596	1.0000	1.0000
Tendon-Span1	Stage2	280.0000	J	1.0087	-40797.8576	-18229.4456	0.9609	1.0000	1.0000
Tendon-Span1	Stage2	286.0000	J	1.0091	-40376.2314	-18102.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	411.0000	J	1.0089	-40954.7568	-18076.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	411.0000	J	1.0082	-41532.2191	-17950.2183	0.9582	1.0000	1.0000
Tendon-Span1	Stage2	536.0000	J	1.0075	-42109.7026	-17824.2595	0.9593	1.0000	1.0000
Tendon-Span1	Stage2	536.0000	J	1.0066	-42687.2314	-17698.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	542.0000	J	1.0082	-42265.2314	-17572.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	542.0000	J	1.0075	-42843.7568	-17446.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	1.0087	-41421.7568	-17320.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	1.0081	-41999.2314	-17194.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	1.0075	-42577.7568	-17068.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	1.0066	-43155.2314	-16942.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	1.0058	-43732.7568	-16816.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	1.0049	-44310.2314	-16690.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	1.0037	-44887.7568	-16564.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	1.0029	-45465.2314	-16438.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	1.0021	-46042.7568	-16312.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	1.0013	-46620.2314	-16186.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	1.0005	-47197.7568	-16060.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9997	-47775.2314	-15934.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9989	-48352.7568	-15808.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9981	-48930.2314	-15682.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9973	-49507.7568	-15556.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9965	-50085.2314	-15430.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9957	-50662.7568	-15304.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9949	-51240.2314	-15178.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9941	-51817.7568	-15052.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9933	-52395.2314	-14926.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9925	-52972.7568	-14800.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9917	-53550.2314	-14674.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9909	-54127.7568	-14548.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9901	-54705.2314	-14422.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9893	-55282.7568	-14296.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9885	-55860.2314	-14170.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9877	-56437.7568	-14044.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9869	-57015.2314	-13918.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9861	-57592.7568	-13792.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9853	-58170.2314	-13666.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9845	-58747.7568	-13540.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9837	-59325.2314	-13414.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9829	-59902.7568	-13288.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9821	-60480.2314	-13162.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9813	-61057.7568	-13036.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9805	-61635.2314	-12910.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9797	-62212.7568	-12784.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9789	-62790.2314	-12658.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9781	-63367.7568	-12532.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9773	-63945.2314	-12406.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9765	-64522.7568	-12280.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9757	-65100.2314	-12154.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9749	-65677.7568	-12028.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9741	-66255.2314	-11902.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9733	-66832.7568	-11776.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9725	-67410.2314	-11650.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9717	-67987.7568	-11524.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9709	-68565.2314	-11398.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9701	-69142.7568	-11272.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9693	-69720.2314	-11146.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9685	-70297.7568	-11020.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9677	-70875.2314	-10894.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9669	-71452.7568	-10768.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9661	-72030.2314	-10642.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9653	-72607.7568	-10516.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9645	-73185.2314	-10390.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9637	-73762.7568	-10264.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9629	-74340.2314	-10138.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9621	-74917.7568	-10012.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9613	-75495.2314	-9886.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9605	-76072.7568	-9760.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9597	-76650.2314	-9634.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9589	-77227.7568	-9508.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9581	-77805.2314	-9382.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9573	-78382.7568	-9256.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9565	-78960.2314	-9130.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9557	-79537.7568	-9004.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9549	-80115.2314	-8878.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9541	-80692.7568	-8752.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9533	-81270.2314	-8626.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9525	-81847.7568	-8500.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9517	-82425.2314	-8374.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9509	-83002.7568	-8248.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9501	-83580.2314	-8122.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9493	-84157.7568	-7996.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9485	-84735.2314	-7870.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9477	-85312.7568	-7744.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9469	-85890.2314	-7618.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9461	-86467.7568	-7492.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9453	-87045.2314	-7366.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9445	-87622.7568	-7240.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9437	-88200.2314	-7114.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9429	-88777.7568	-6988.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9421	-89355.2314	-6862.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9413	-89932.7568	-6736.2854	0.9613	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9405	-90510.2314	-6610.2571	0.9616	1.0000	1.0000
Tendon-Span1	Stage2	673.0000	J	0.9397	-9				

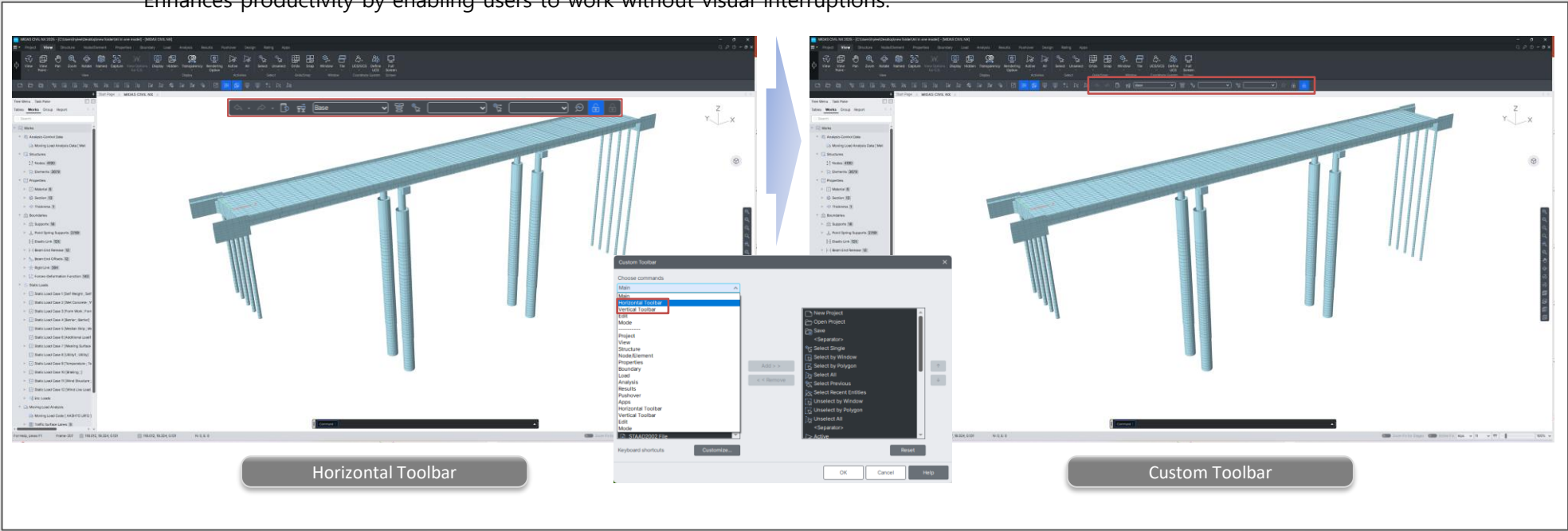
20. Flexible Dual Tree Menu Layout and External Docking

- The Dual Tree Menu functionality has been enhanced for improved usability in large and complex projects.
- Previously, the dual tree view was limited to left-right split view, with one tree on each side. In the new version, users can arrange both tree menus on either the left or right side as needed. Alternatively, the tree menu can be undocked and used as a separate floating window, ideal for dual-monitor setups.



21. Full Customization of Horizontal Toolbar Functions

- The Horizontal Toolbar, previously fixed at the top of the model view, now offers full customization and docking flexibility.
- In previous versions, key tools such as Node/Element Selection Combo Boxes and Construction Stage selection could not be added to the Custom Toolbar.
- In the new version, all functions and icons from the Horizontal Toolbar can now be added directly to the Custom Toolbar. Users can select the entire Horizontal Toolbar as a grouped item for easy integration into the Custom Toolbar, without needing to add functions individually.
For users who prefer an unobstructed model view, the Horizontal Toolbar can now be completely hidden, with all necessary tools docked in the Custom Toolbar.
- **Benefits :** Prevents the toolbar from obstructing the model view or appearing in screen captures.
Allows for a cleaner and more personalized interface, improving usability and visibility during modeling and reporting.
Enhances productivity by enabling users to work without visual interruptions.



22. Addition of Active Fix and Zoom Fix for Stage to Status Bar

- The previously available Active Fix and Zoom Fix for Stage functions in MIDAS CIVIL NX have now been added directly to the status bar for quicker and easier access. In previous versions, key tools such as Node/Element Selection Combo Boxes and Construction Stage selection could not be added to the Custom Toolbar.
- **Zoom Fix for Stage** allows users to fix the view zoom and orientation in the Model View while switching between different construction stages for visual consistency.
- **Active Fix** keeps the activated elements fixed in the Model View, enabling users to review construction stage analysis results without resetting the view. Active Fix is available only after construction stage analysis is completed.
- **Benefits :** Simplifies stage-by-stage result verification without losing the current view.
Improves efficiency in checking staged results by maintaining consistent focus on key elements.

