TECHNIA
PART OF ADDNODE GROUP

BRIGADE/Standard Datasheet

This document provides an overview of information about the various tools and features available in BRIGADE/Standard.

For more detailed information about the product, please contact one of our experts via the BRIGADE webpage. For troubleshooting, please send in your service request via our TECHNIA Customer Care portal.

BRIGADE
Standard

Contents

Overview

BRIGADE/Standard has a unique user interface specifically designed for 3D modelling and analysis of the most common types of bridge structures. The intuitive interface is easy-to-learn for new users and yet highly productive for experienced users.

The parametric modelling concept is based on typical bridge components such as stake-out line, support lines, bridge deck, longitudinal and transversal beams, prestress tendons, bearings, columns, abutments, foundations etc. In addition, BRIGADE/Standard includes predefined loads, vehicles and load combinations in accordance with a wide range of design codes including the Eurocodes with various National Annexes.

The results are easily visualized in 3D plots and 2D graphs and can be exported to MS Word and MS Excel.

TECHNIA
PART OF ADDNODE GROUP

BRIGADE Standard

Key Features of BRIGADE/Standard

EASY-TO-USE MODELING ENVIRONMENT

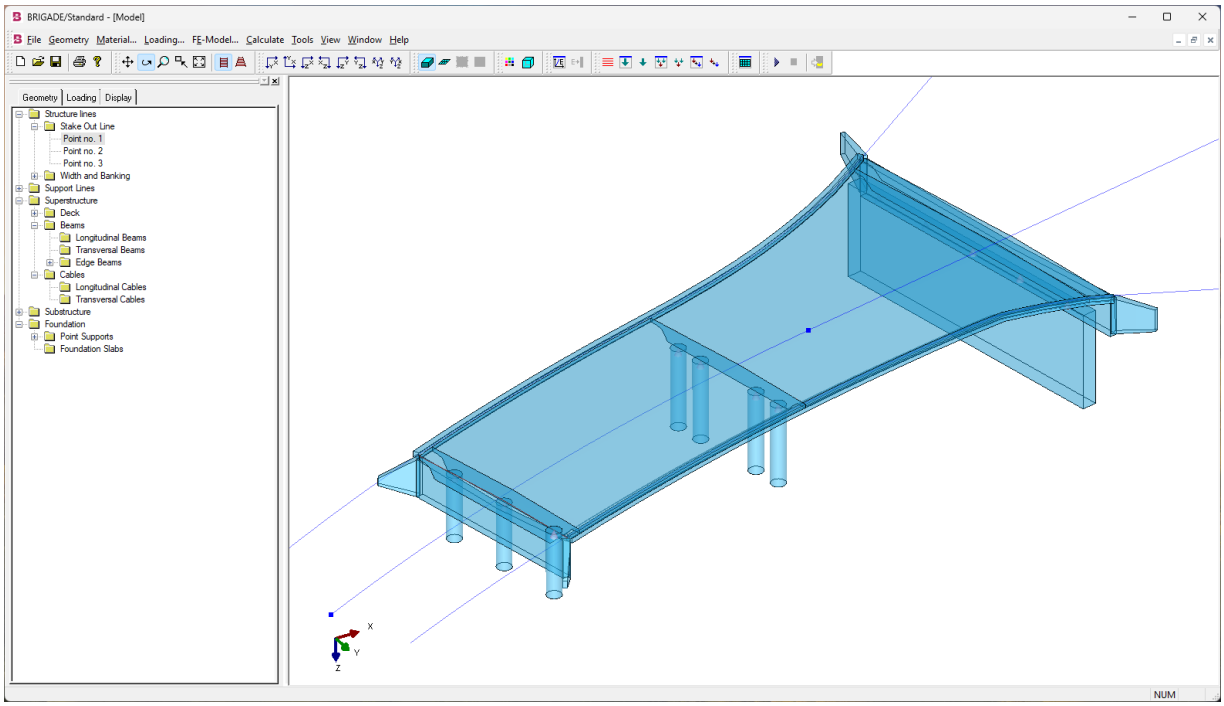
BRIGADE/Standard provides a powerful, yet user-friendly 3D modeling environment tailored specifically for bridge engineers. The intuitive interface strikes a perfect balance—easy to grasp for beginners, yet highly efficient and productive for experienced users working on complex infrastructure projects.

At the core of every model is the stake-out line, a reference geometry that defines the longitudinal alignment or centerline of the bridge. This line forms the backbone of the entire structural model, enabling consistent positioning, orientation, and parametrization of all other components. With this central concept, users can model both simple and highly curved bridges with confidence and precision.

Using the stake-out line as a geometric base, users can easily define and position key bridge elements such as:

- Deck
- Columns
- Banking
- Longitudinal Beams
- Transversal Beams
- Abutments
- Point Supports
- Foundation
- Prestress Cables

This structured modeling approach ensures coherence throughout the design process, reduces the risk of input errors, and enables rapid model updates when design changes occur. Whether working in early conceptual stages or in detailed final design, BRIGADE/Standard offers a modeling workflow that is as robust as it is flexible.

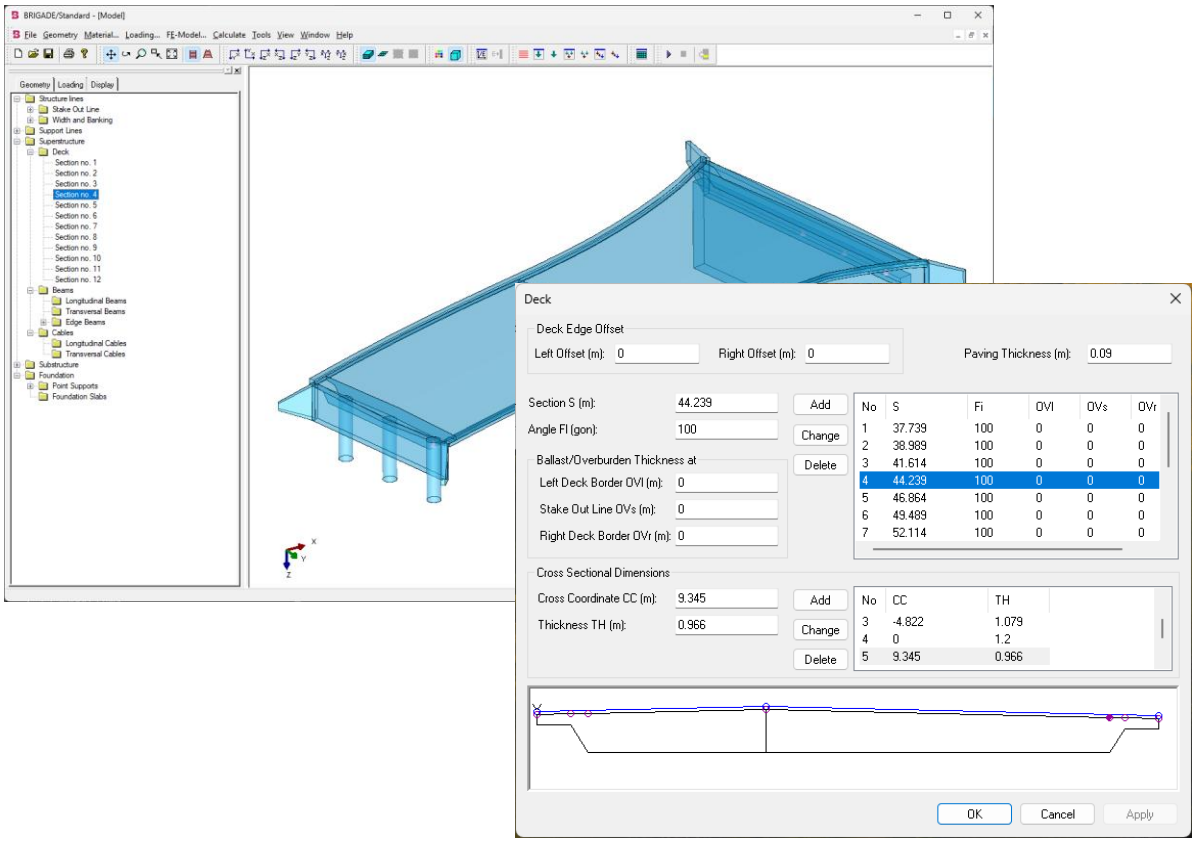


PARAMETRIC MODELING

BRIGADE/Standard is built on a powerful parametric modelling framework that enables engineers to define, modify, and control bridge models with high speed and precision. Every aspect of the structural model, such as geometry, materials, boundary conditions, loads, and mesh properties, is defined through intuitive parameters.

As the user updates any part of the model, related elements automatically adapt in size, position, and behaviour. This interdependence between structural components significantly reduces the time spent on manual adjustments and eliminates common modelling errors. Whether you're refining the span length, modifying support conditions, or testing new load scenarios, BRIGADE/Standard ensures that the entire model remains coherent and up to date.

This parametric workflow is especially powerful during early design iterations, sensitivity studies, or when tailoring a single model to multiple design alternatives or bridge configurations. It empowers engineers to focus on design decisions rather than repetitive modelling tasks.



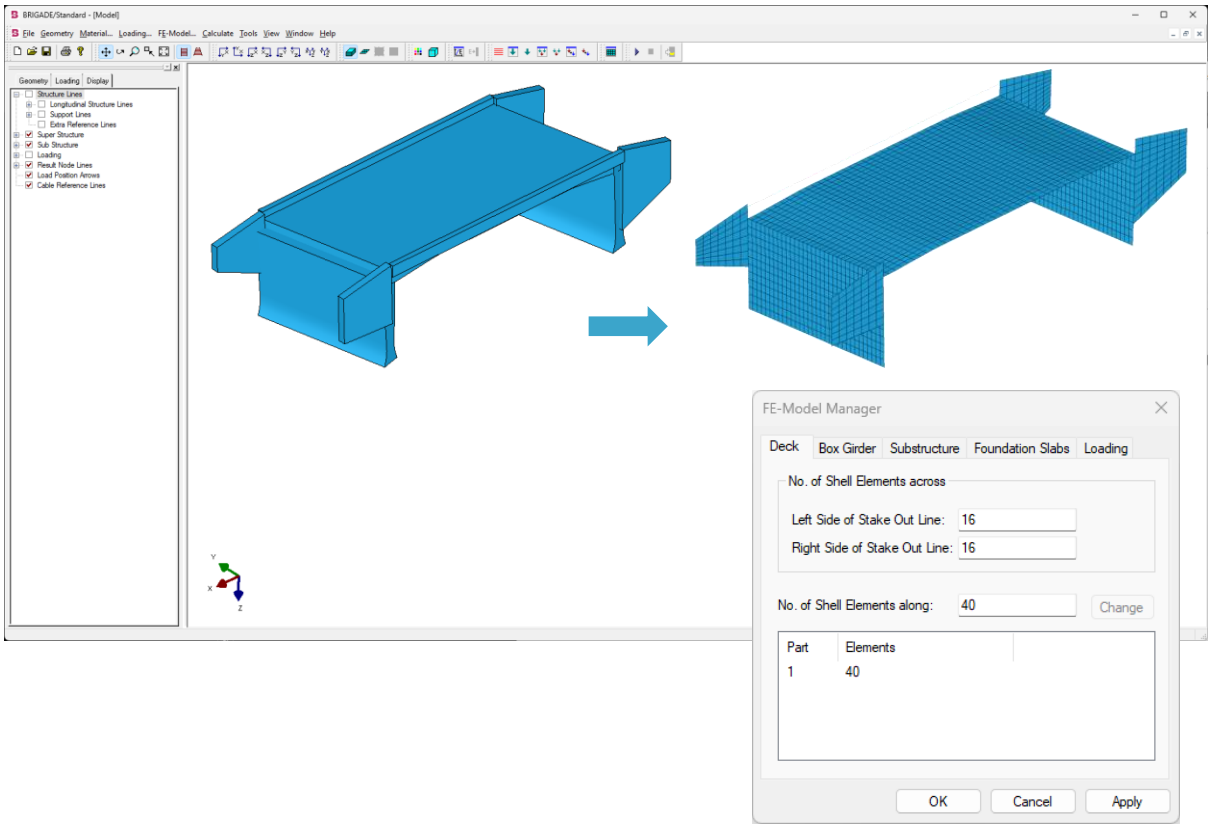
AUTO-MESHING

BRIGADE/Standard streamlines the finite element modeling process through its robust auto-meshing functionality. Based on the parametric geometry defined by the user, the software automatically generates a high-quality mesh that is ready for analysis, eliminating the need for manual mesh generation and refinement.

The mesh density is easily and intuitively controlled through the FE-Model Manager, allowing users to balance computational efficiency with the required level of detail. Whether performing early design assessments or detailed final verifications, engineers have full control over how fine or coarse the mesh should be.

Meshes are consistently structured in a longitudinal and transverse direction, using four-node shell elements that are optimized for civil structures. This logical arrangement ensures that post-processing is both efficient and insightful. Result lines are automatically aligned with key structural axes, making it easy to extract sectional forces, deformations, and other quantities critical to bridge design and verification.

By integrating auto-meshing with intelligent model structuring, BRIGADE/Standard provides a seamless transition from modeling to analysis and interpretation—freeing up time for what really matters: engineering decisions.

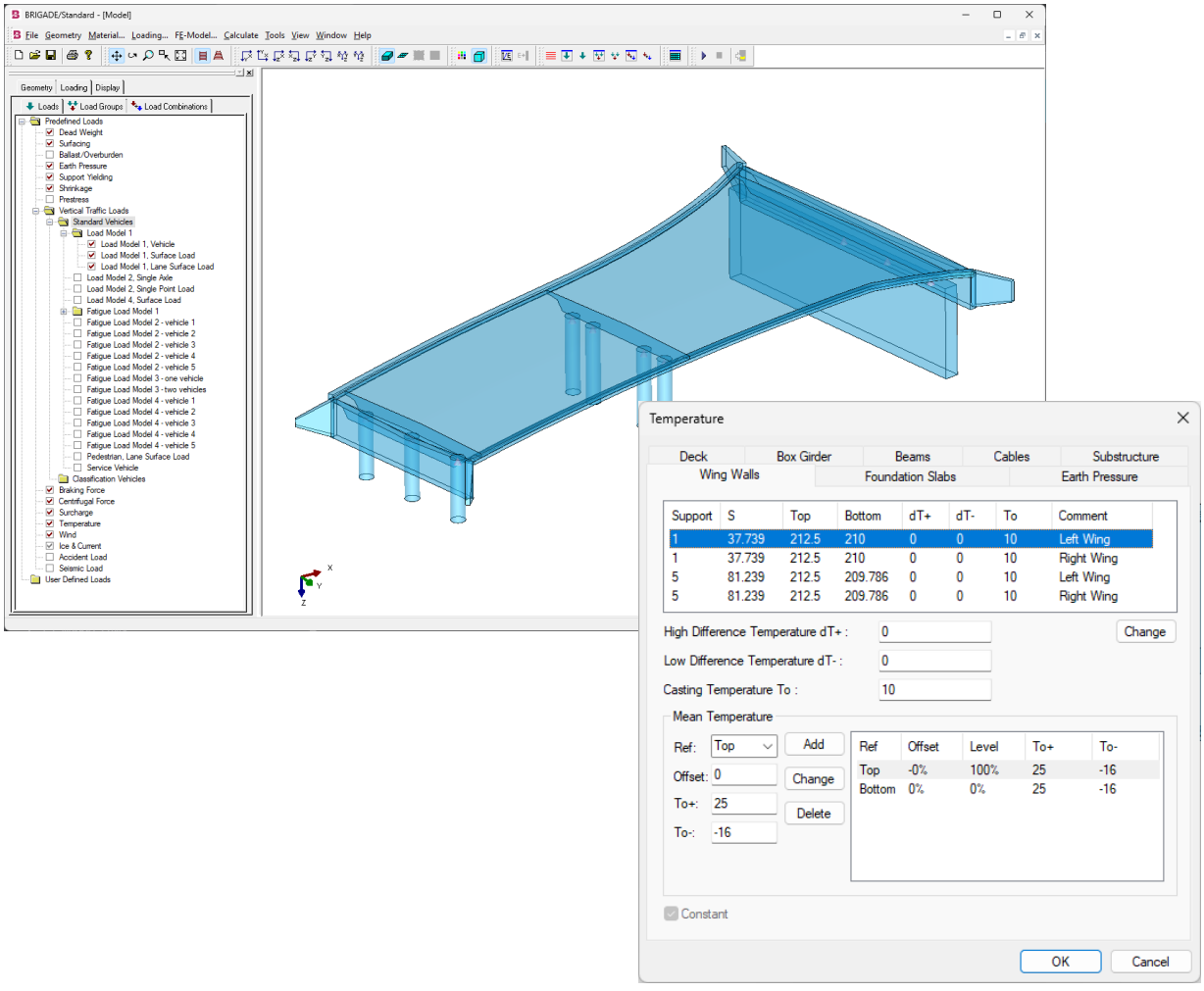


PREDEFINED LOADS

BRIGADE/Standard comes equipped with a comprehensive library of predefined load types, tailored specifically for the needs of bridge design and analysis. This significantly accelerates the modeling process and ensures consistency with relevant design codes and real-world conditions.

Users can easily activate, modify, and combine these loads with just a few clicks, making it simple to simulate both everyday operational conditions and rare extreme events. Each load is fully parameterized and can be adjusted in terms of magnitude, distribution, and application method, offering both flexibility and precision. These are some of the pre-defined loads:

- Dead Weight
- Surfacing
- Pre-stressing,
- Shrinkage
- Moving Traffic Loads
- Braking Forces
- Temperature
- Wind load
- Seismic load



MOVING LOADS

BRIGADE/Standard offers a market-leading solution for analyzing the structural response to moving loads – an essential aspect of bridge engineering. The method is built on the use of influence surfaces and lines, providing precise and efficient evaluation of how different vehicle configurations affect the structure under service and ultimate load conditions.

Thanks to a mesh-independent lane definition, traffic lanes can be positioned flexibly and logically – regardless of element layout – giving engineers full control over vehicle path alignment without compromising analysis accuracy.

Vehicles can consist of

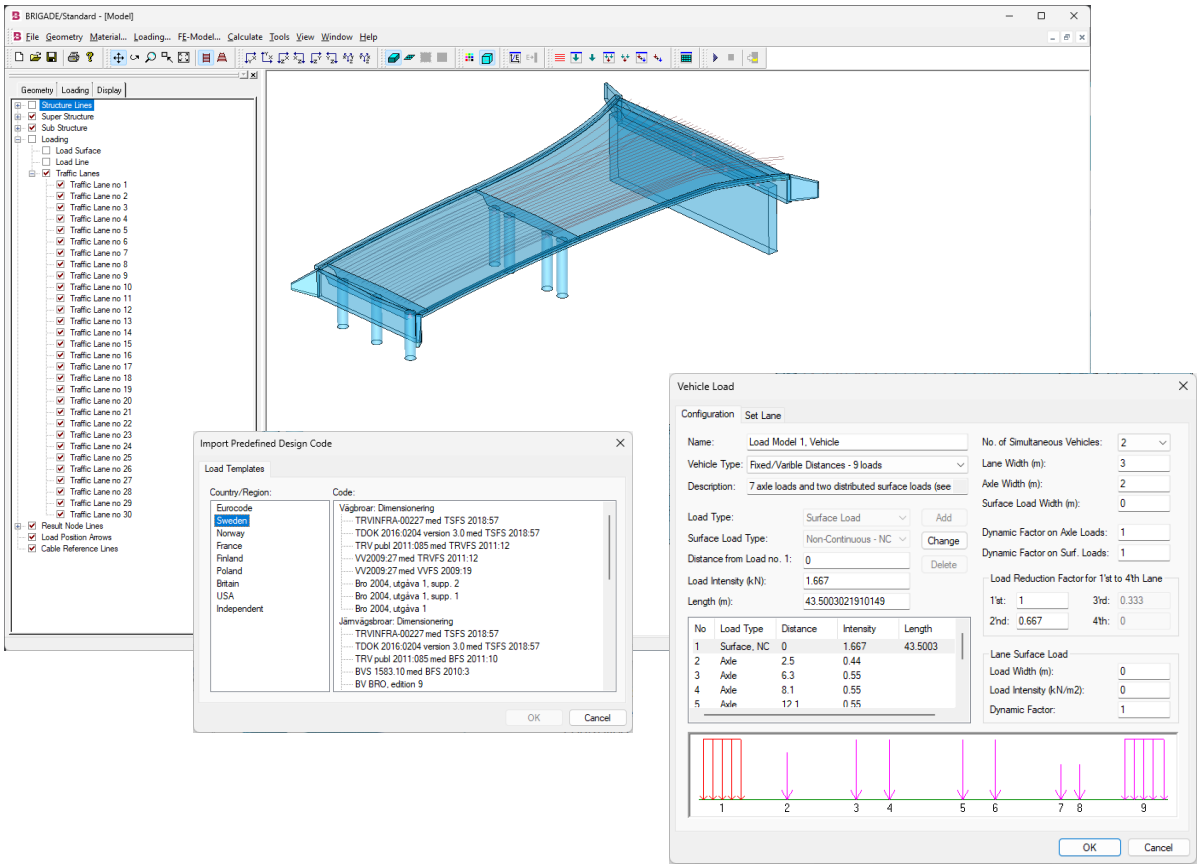
- axles with *fixed* internal distance
- axles with *variable* internal distances and
- combination of *axel- and moving surface loads*.

The system can automatically handle multiple vehicles across several traffic lanes, applying influence-based optimization to determine the most unfavourable vehicle positions. This allows for fast and conservative evaluation of critical load effects without manual iteration.

Vehicles can be:

- Manually defined to match project-specific configurations
- Automatically generated from a built-in library of code-compliant vehicle types—such as those specified in Eurocode

This combination of flexibility, precision, and automation makes BRIGADE/Standard one of the most powerful tools on the market for load evaluation in bridge structures.



PRESTRESSING

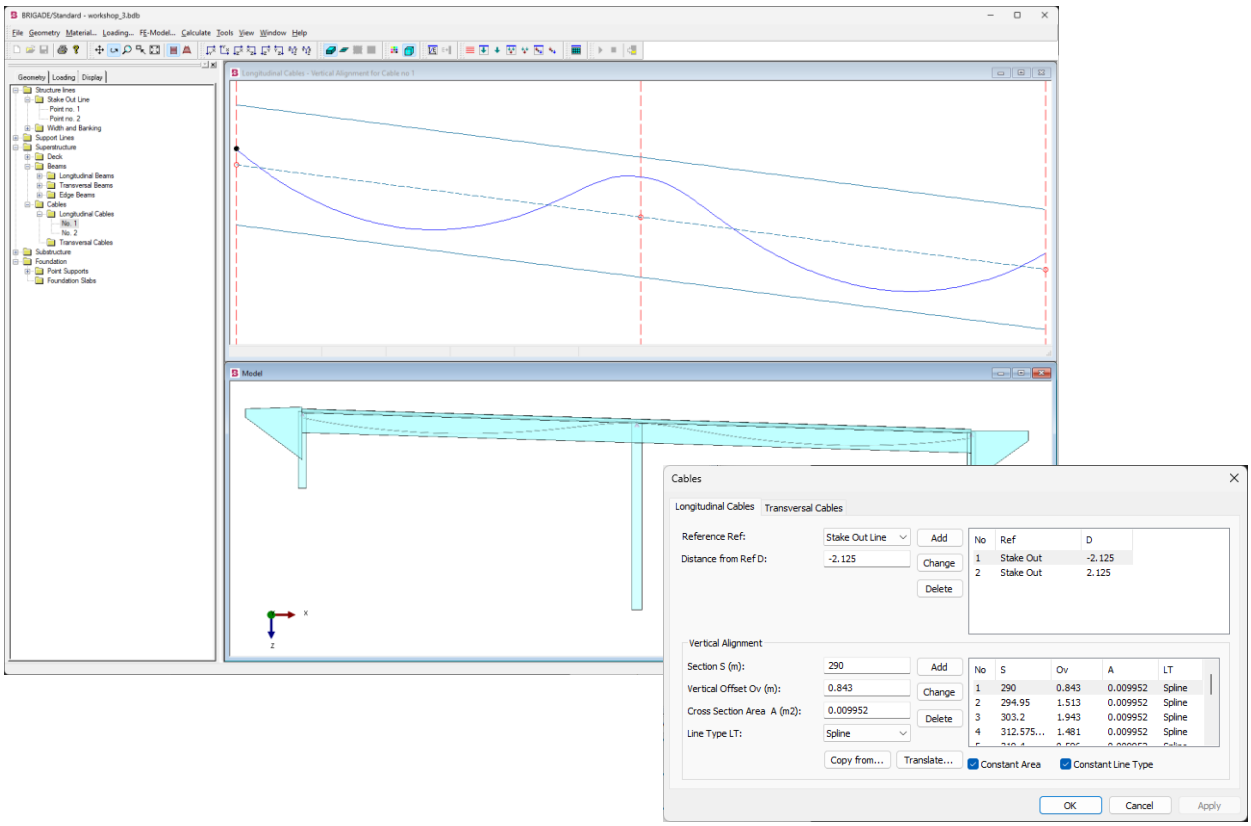
BRIGADE/Standard offers a powerful and intuitive environment for modeling and analyzing prestressed structures, a critical capability for modern bridge design.

Users can quickly define the geometry of both longitudinal and transverse tendons. The tendon paths are fully parametric and integrated into the bridge model, ensuring that any change in geometry or structural configuration is instantly reflected in the prestressing system.

The software automatically calculates short-term prestress losses, such as friction and anchorage slip, based on tendon layout and material properties. For long-term losses – such as creep, shrinkage, and relaxation – users can incorporate time-dependent effects using the calculated concrete and tendon stresses from quasi-static load combinations.

The following types of prestress losses can be considered in the analysis model:

Short-term losses	Long-term losses
• friction	• concrete shrinkage
• wobble and	• concrete creep and
• anchorage slippage	• relaxation in steel cables



LOAD COMBINATION

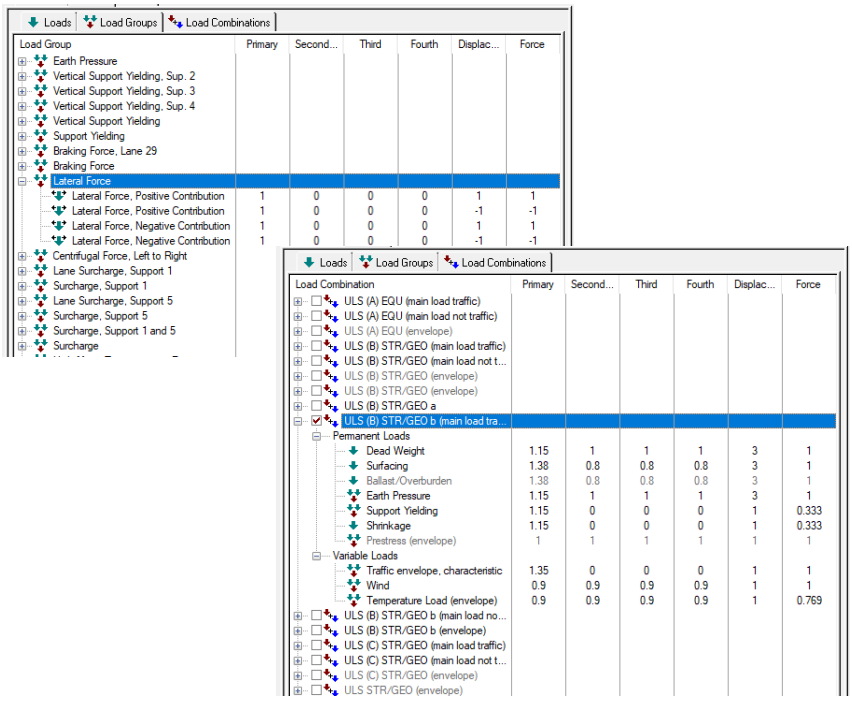
BRIGADE/Standard features a state-of-the-art load combination engine that simplifies and automates one of the most complex parts of structural analysis. The system intelligently determines whether each load case has a favourable or unfavourable effect on the structure, ensuring that critical combinations are neither overlooked nor over-conservatively estimated.

This is achieved through the concept of Load Groups, where loads of the same nature – such as permanent loads, variable traffic loads, or thermal effects – are grouped and treated consistently. Each group carries information about partial factors, variability, and simultaneity rules, as defined by the selected design standard.

Users can either:

- Manually define their own load combinations, tailored to specific project or client requirements
- Or automatically generate combinations from a built-in library of code-compliant rules, such as those from the Eurocode or other international standards

This combination logic is deeply integrated into the solver workflow, meaning that engineers can go from load definition to verified results with minimal risk of manual error – and maximum transparency. The result is a robust and efficient design process that's aligned with modern code requirements and practical engineering workflows.



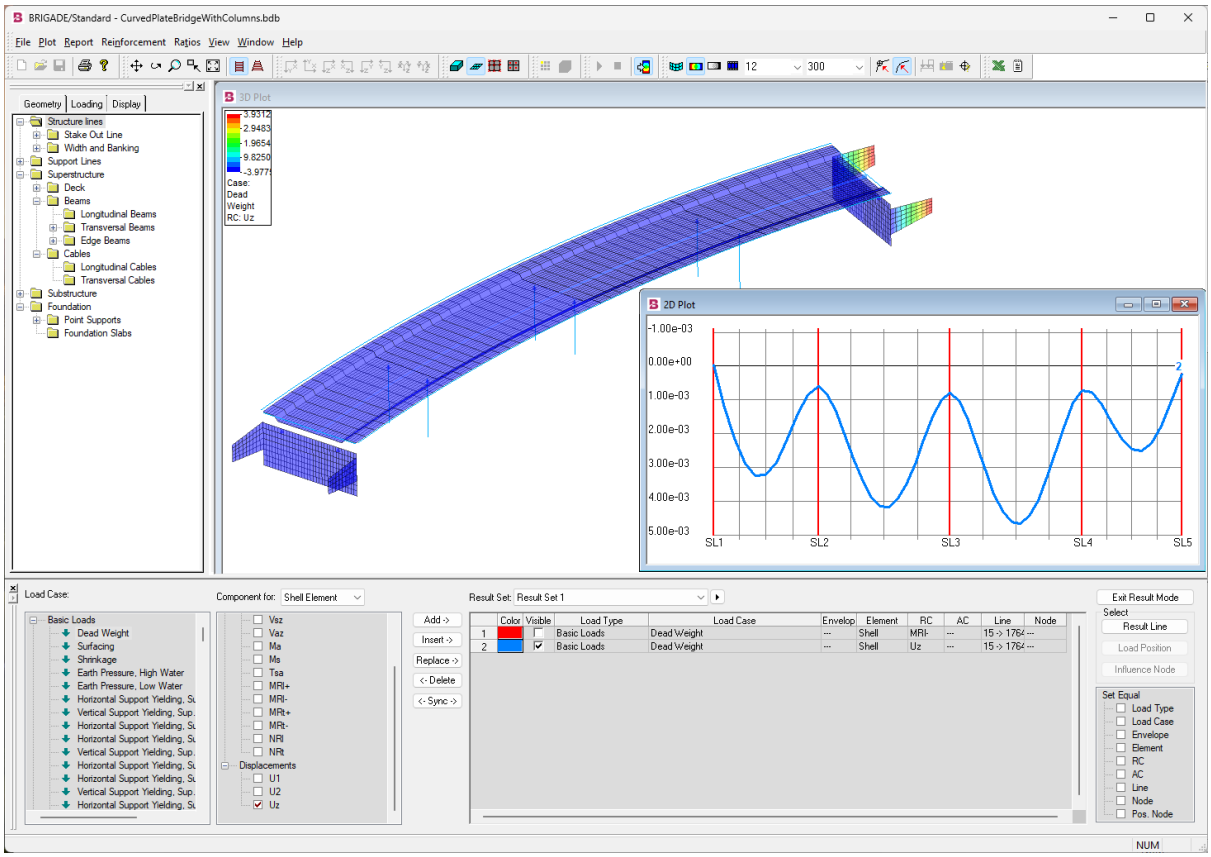
RESULT VISUALIZATION

BRIGADE/Standard offers a wide range of post-processing features to enable efficient interpretation of results:

- Contour plots
- Diagram plots
- Vector plots
- Animation of results
- Visualization of most adverse live load positions
- Result report generators
- Export to MS Excel, CSV and ConcreteDesigner

The integrated 2D-plot tool provides a simple and quick way to view and interpret the results. The different output results - including design sectional forces - are conveniently listed for each load case/combination, from which the user to choose from to plot 2D and 3D-plots.

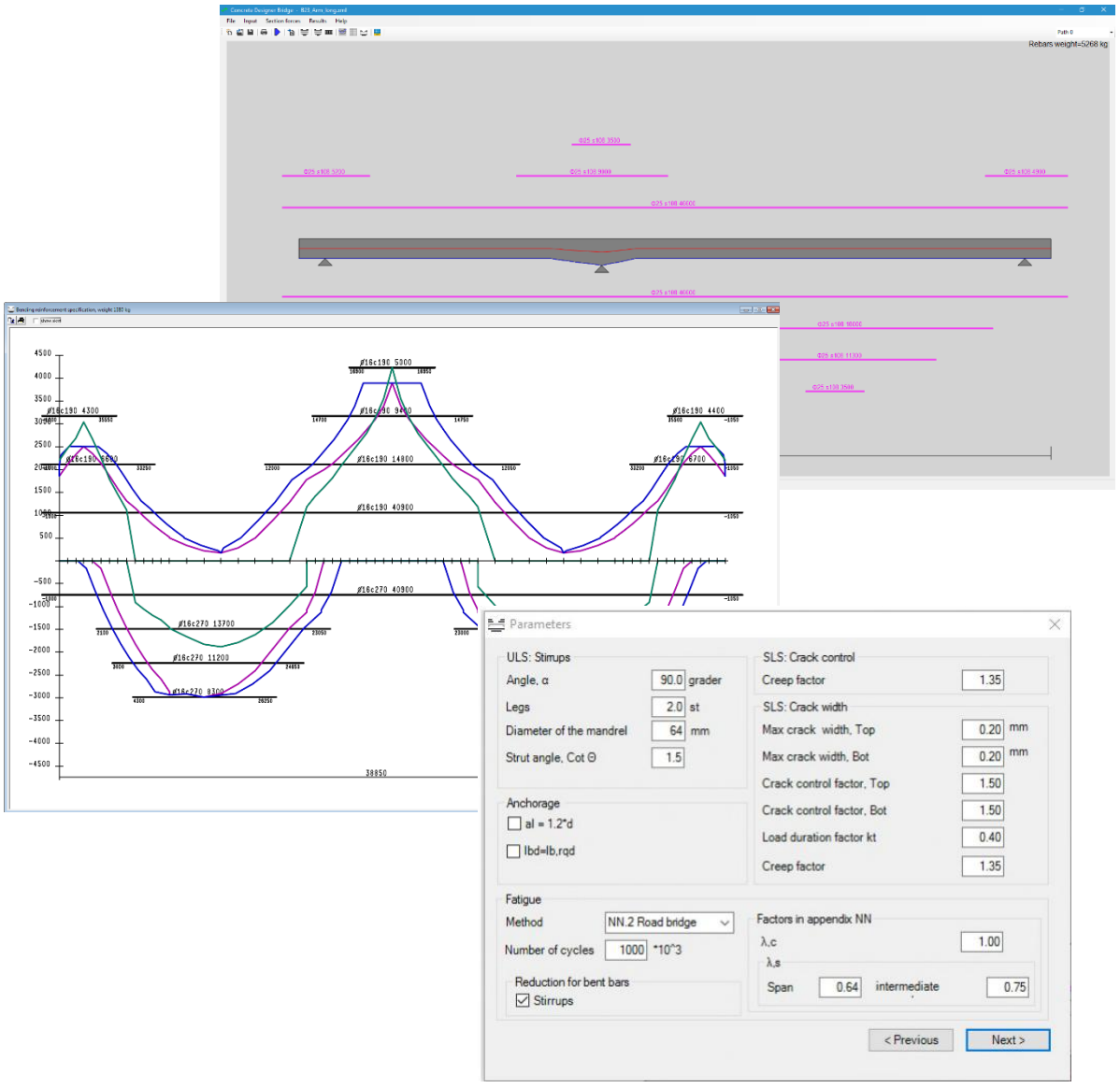
The result line -used for the 2D-plot – is chosen by selecting a line in the model.



REINFORCEMENT DESIGN

BRIGADE/Standard calculates the design section forces and moments automatically. The need for reinforcement in accordance with Eurocode can then be easily calculated using these results.

The results can be exported on a format that is specially tailored for the Software ConcreteDesigner, developed by Eurocode Software (demo video)



INTEGRATED ABAQUS SOLVER TECHNOLOGY

BRIGADE/Standard includes an integrated Abaqus FEA solver from Dassault Systèmes, the leading provider of high-end finite element technology. This ensures not only accurate and efficient analysis, but also long-term continuity.

Since Abaqus is under active development by a global R&D team, users of BRIGADE benefit from a solver that steadily improves in performance, robustness and numerical capabilities.

System requirements

BRIGADE/Standard is a powerful tool, yet systems requirements are relatively low.

HARDWARE

It is possible to set up, analyse and post-process a bridge model in BRIGADE/Standard with a regular laptop. Although there is a 3D-representation of the model in the software, there will never be any heavy load on the graphics card. The analysis always run on one CPU (no parallelization).

The FE-solver is memory intensive. You will benefit most from more RAM and fast storage

SOFTWARE

BRIGADE/Standard only run on Windows OS. We always recommend using the latest Windows OS although it is likely that it will run on older versions of Windows as well.

SUMMARY

The following list is a recommendation for computer system requirement. It considers that you probably want to be able to run other applications on your computer at the same time as you work with BRIGADE/Standard.

What	Minimum Requirements	Recommendation
Processor	Dual-core Intel i5 or AMD Ryzen 5	Intel i7 / i9 (12^{th} -14^{th} Gen), or AMD Ryzen 7/9 / Threadripper
Memory (RAM)	8 GB	32 GB DDR4 or DDR5
Storage	50 GB free space	512 GB NVMe SSD
Graphics	Integrated GPU	Dedicated GPU
Network	Required for floating license	Required for floating license
Operating System	Windows 10/11 64-bit	Latest Windows OS