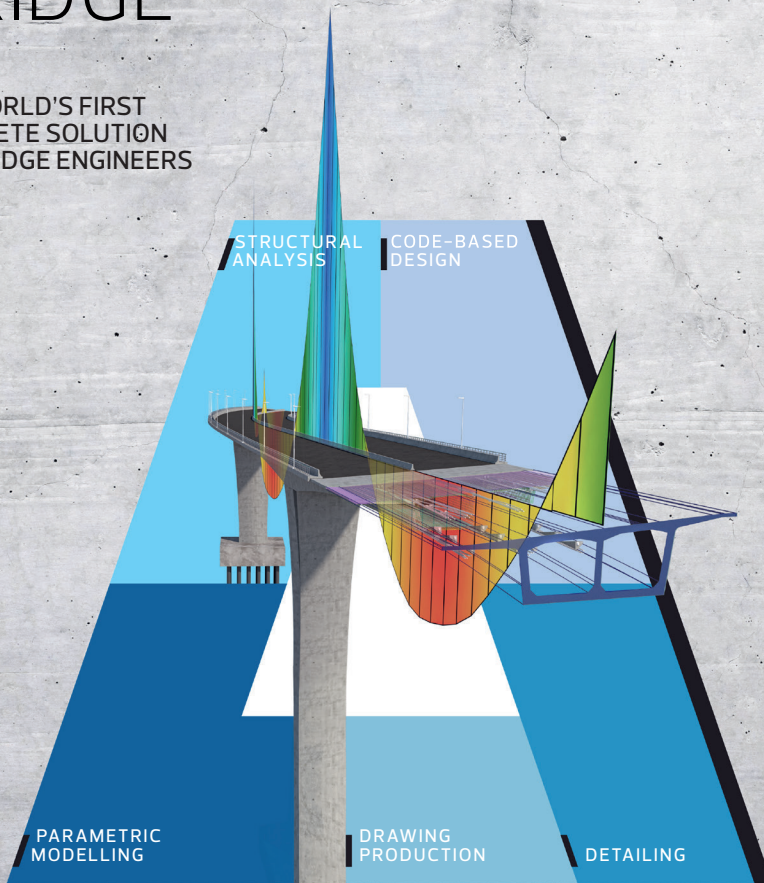


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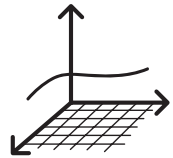
MODELING, ANALYSIS, DESIGN AND DETAILING IN 4D

Allplan Bridge makes all this possible – easier, faster and more precise than ever before.

Modifications of bridge models are time consuming and error prone. With Allplan Bridge, bridge modelers, structural engineers and detailers can overcome these challenges. Due to the high level of detail, the geometrical and the analytical model are ideal for visual design and coordination: If you change your model in one place, all the associated bridge elements, including the analysis model, automatically adjust.

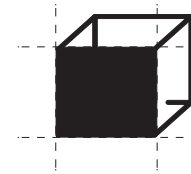
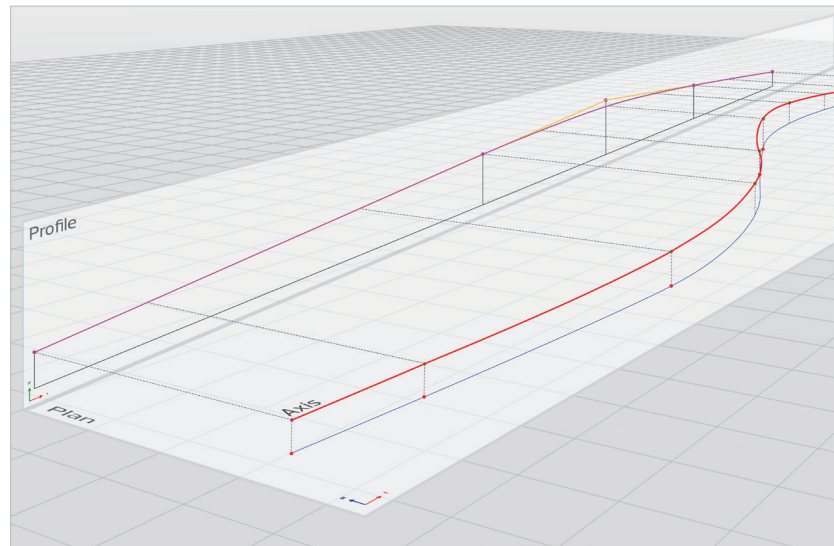
Free webinars and a trial version
can be downloaded at [allplan.asia](https://www.allplan.asia)

EFFICIENT WORKFLOW WITH ALLPLAN BRIDGE



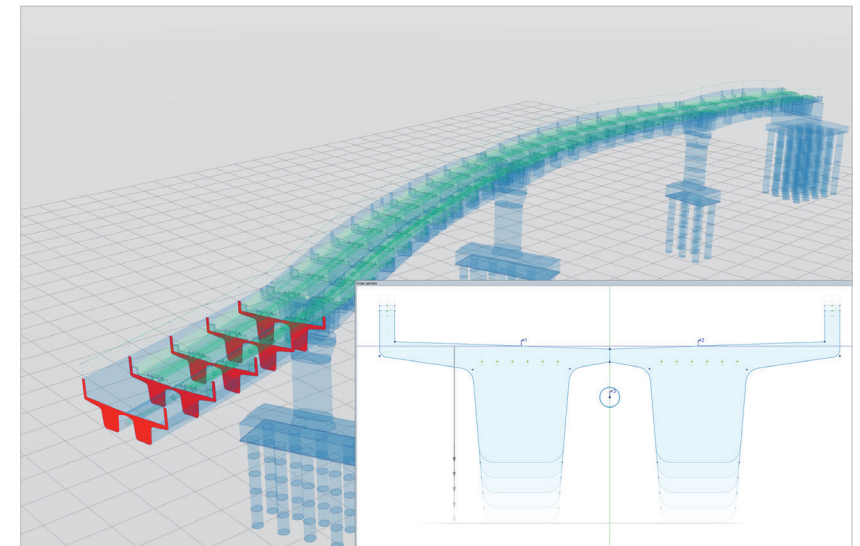
1. CREATING AXES

Every bridge construction project starts with one or more axes – with Allplan Bridge, you can adopt the data from an existing design (using LandXML data format) or define it manually. In both cases, the alignment is parametrically saved.

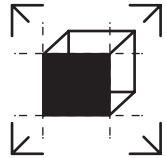


2. DEFINING A CROSS-SECTION

You can define any cross-section and determine the geometry with its dependencies and variables. These parametric cross-sections can be adapted at any time and can be saved as a template and reused.

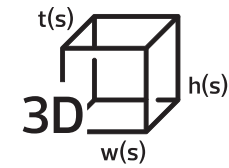
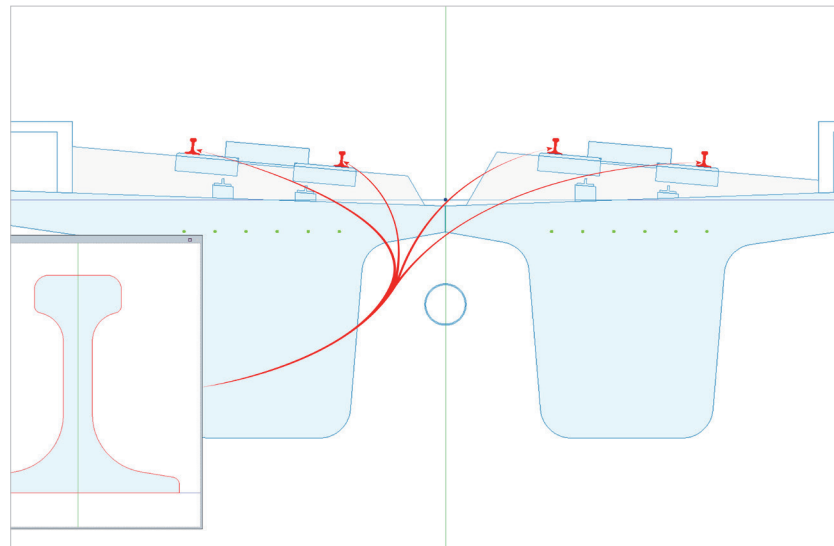


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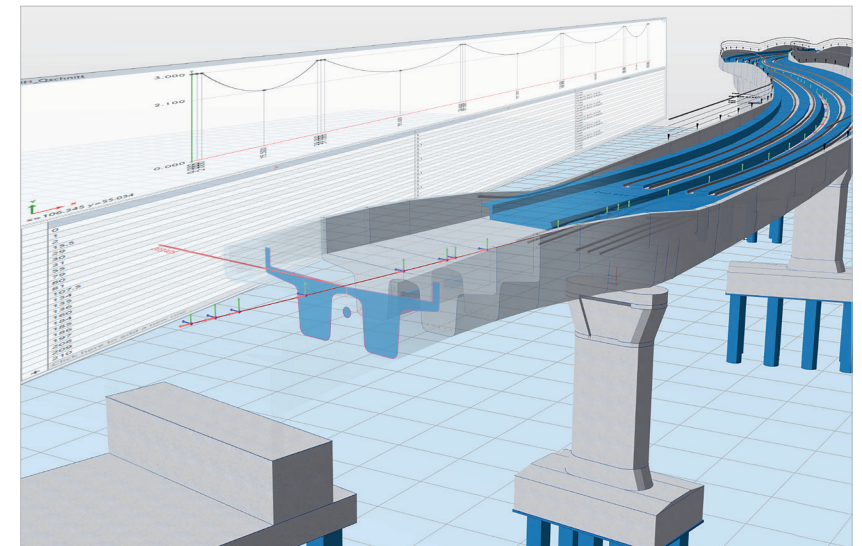
3. REFERENCING STANDARD PROFILES

When defining the cross-section, standardized and repeatedly arranged cross-section parts (like longitudinal stiffeners in steel and composite sections or prefabricated girders) can be easily placed in the section. I.e. this enables the automatic adaptation of the geometry to the cross-sectional shape.

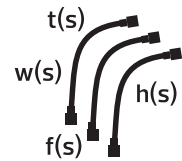


4. PARAMETRIC MODELING

The multidiscipline model in Allplan Bridge is completely parametric. Changes can be made at any time. The dependent objects are automatically adjusted. Allplan Bridge is suitable for all phases of work – from the concept to construction planning and detailed design.

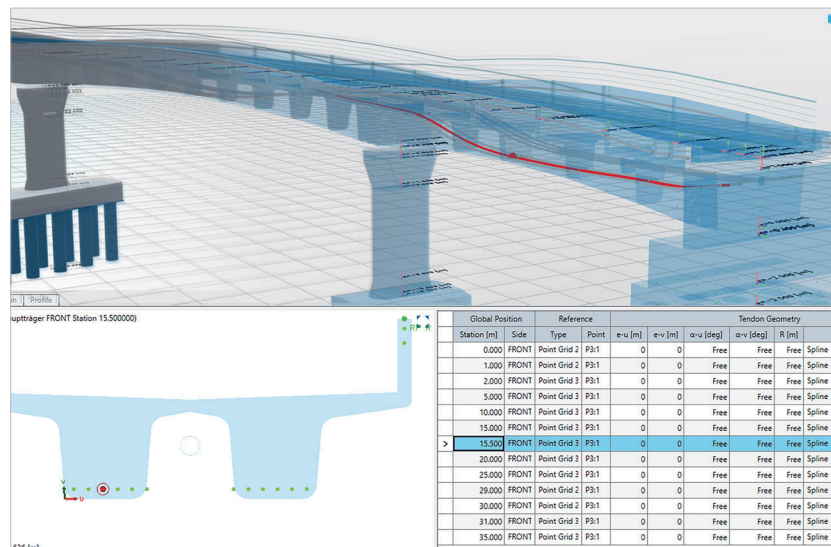


EFFICIENT WORKFLOW WITH ALLPLAN BRIDGE



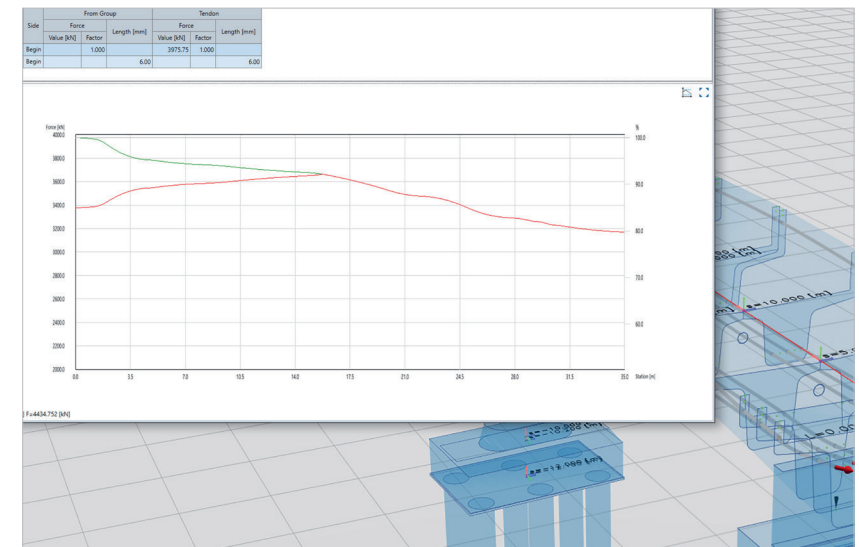
5. PARAMETRIC MODELING OF PRE- AND POST-TENSIONING

Allplan Bridge can be used to create several parametric pre-tensioned and post-tensioned tendon types – with immediate and subsequent bonding, internal and external, longitudinal, transverse and vertical. Functions like copying, mirroring, etc. accelerate the work process furthermore.

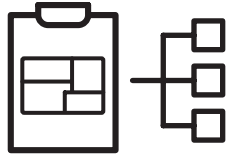


6. PLANNING THE TENSIONING PROCESS

The tensioning actions "stressing", "releasing" and "wedge slip" are available and can be applied at the beginning, the end or simultaneously on both sides of the tensioning cable. The tension force losses due to friction and wobbling are calculated based on the cable geometry and the material properties.

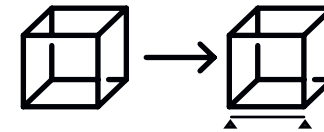
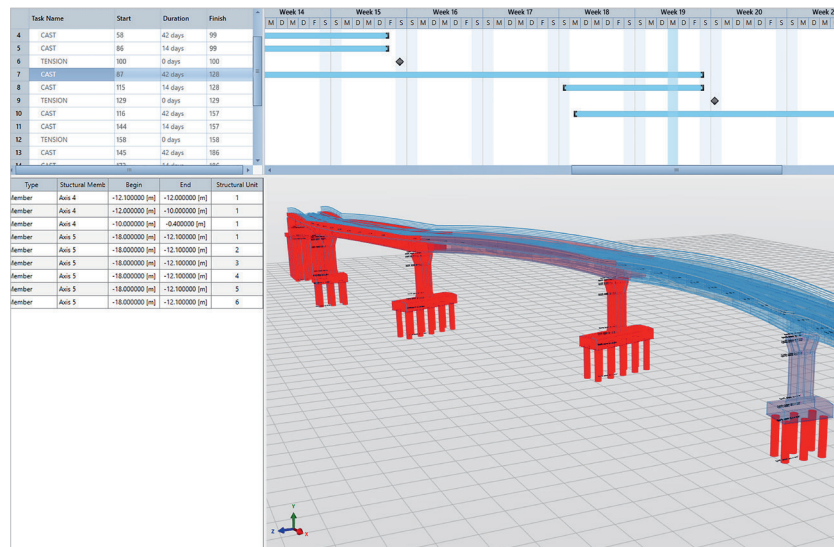


EFFICIENT WORKFLOW WITH ALLPLAN BRIDGE



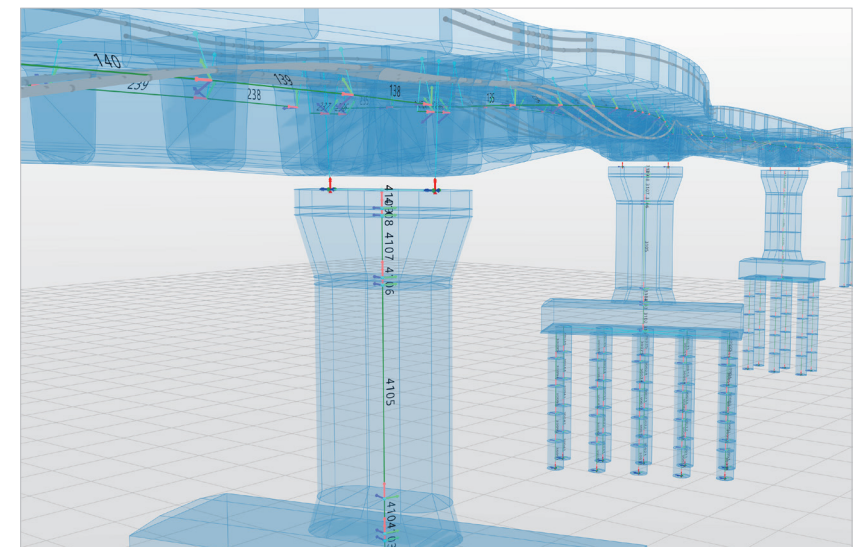
7. 4TH DIMENSION: CONSTRUCTION SCHEDULE DEFINITION

Time as the 4th dimension is considered by easily specifying the construction process. The construction plan is divided into several phases and further into individual tasks, such as concrete pouring and hardening, tendon stressing, etc. The related structural components are interactively assigned to these tasks.

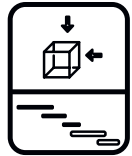


8. AUTOMATIC DERIVATION OF THE ANALYSIS MODEL

Thanks to the breakthrough technology, Allplan Bridge automatically generates the analysis model from the geometrical model. This greatly reduces the amount of work and the susceptibility to errors. Hereby the engineer retains full control by specifying structural parts and those ones which contribute as load only. One of additional analysis-relevant definition is the choice of generating a beam or a grillage model.

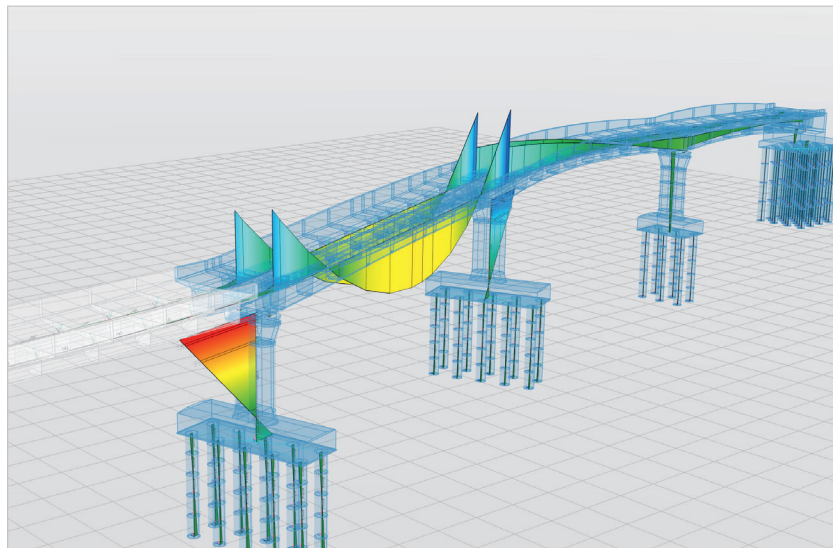


EFFICIENT WORKFLOW WITH ALLPLAN BRIDGE



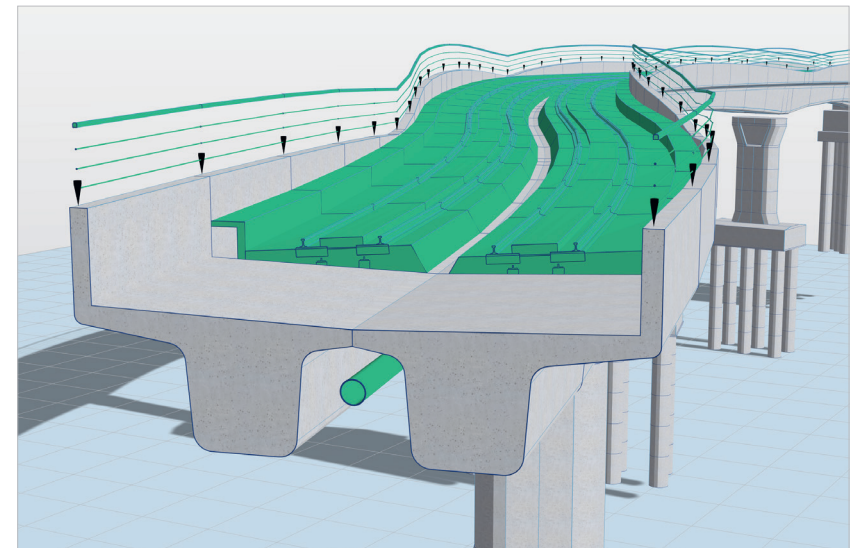
9. ASSEMBLING CONSTRUCTION SEQUENCE CALCULATION

Allplan Bridge analyses the defined construction schedule and sets up all necessary calculation definitions in an automated process, like load cases, element activations and calculation actions. This includes input data for calculating nonlinear time effects, like creep and shrinkage. Complete transparency is granted, the user keeps full control of the generated items and result overview at any time of construction.

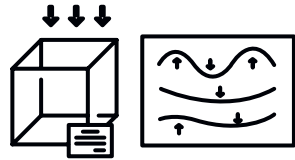


10. APPLY ADDITIONAL LOADS

The weight and the position of superimposed dead loads (like sidewalk, road pavement, etc.) are automatically retrieved from the geometrical model. The user needs to specify the point in time of the equipment installation, and consequently the load is applied on the structural system. Additional loads, like temperature change or wind loads, can be defined and applied easily as well.

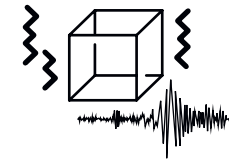
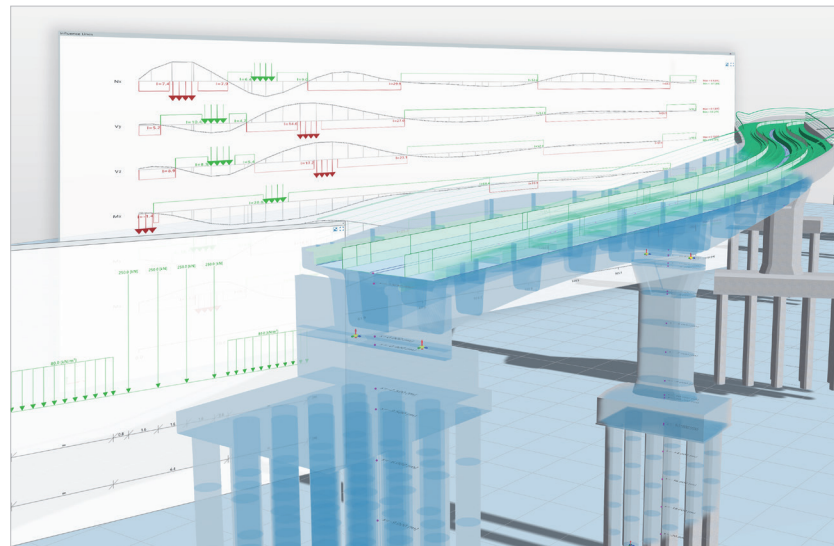


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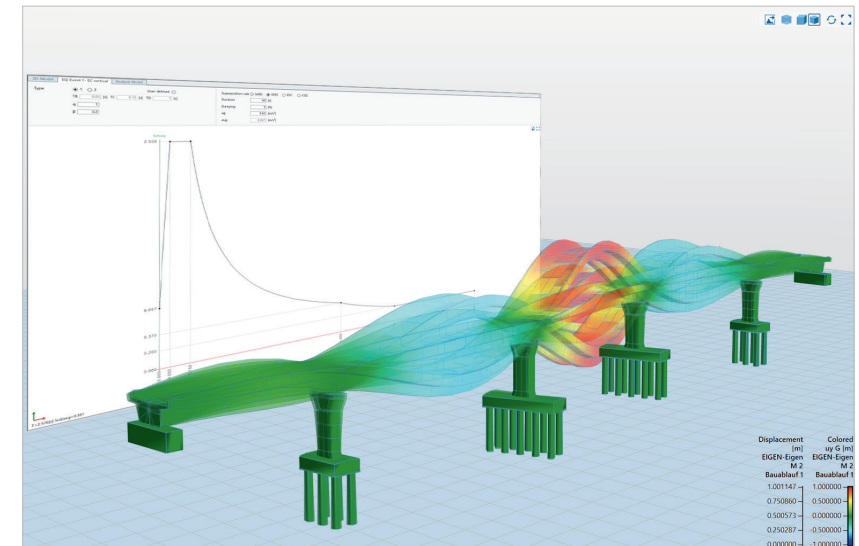
11. TRAFFIC LOAD

Traffic loads can be defined/applied in a very comfortable way in accordance with the selected standard. On the other side the generic approach allows to consider any type of moving load. The calculation allows for calculating the most unfavorable effects due to traffic. In the first step the influence lines are calculated and in the second step the influence lines are evaluated with the corresponding load train (vehicle) and the results are stored into an envelope..

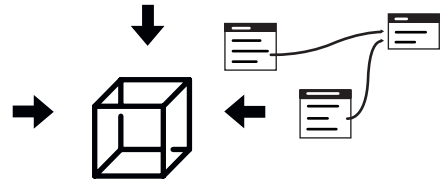


12. EARTHQUAKE LOAD

Allplan Bridge uses the multi-mode Response Spectrum Method for evaluating the effects of seismic loading. Mathematically, this solution is based on the excitation of the relevant natural modes and combining the different modal contributions. Internal force and displacement amplitudes related to the individual natural modes are superimposed using different methods, such as the Complete Quadratic Combination (CQC) to get the envelope of extreme values.

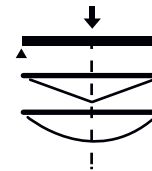
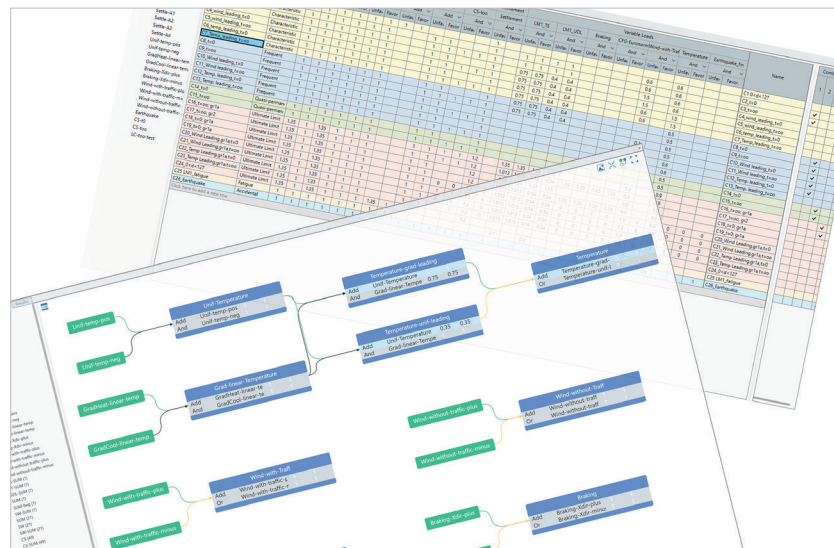


EFFICIENT WORKFLOW WITH ALLPLAN BRIDGE



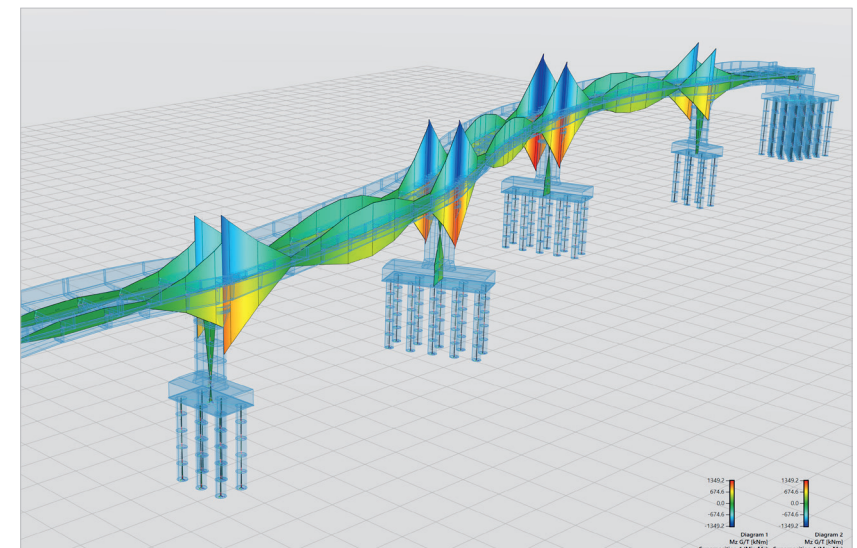
13. SUPERPOSITION & COMBINATIONS

The user-friendliness and usability of the superposition in Allplan Bridge is groundbreaking. The schematic definition of the superposition combines maximum flexibility and optimal overview. Same applies for the combinations, which are defined and visualized in a table form, giving the user optimal overview of different combination types and load factors. Furthermore, it is possible to select several stress components in user-defined stress points and perform a stress leading superposition.

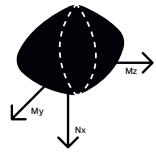


14. PERFORMING STRUCTURAL ANALYSIS

A global static analysis based on the Bernoulli beam theory is performed for all automatically and manually generated calculation actions defined previously in the construction sequence definition. The analysis is enhanced to accurately consider the cross-section variation. Furthermore, the nonlinear calculation of time dependent effects is performed, considering design code formulas.

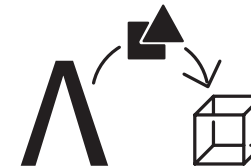
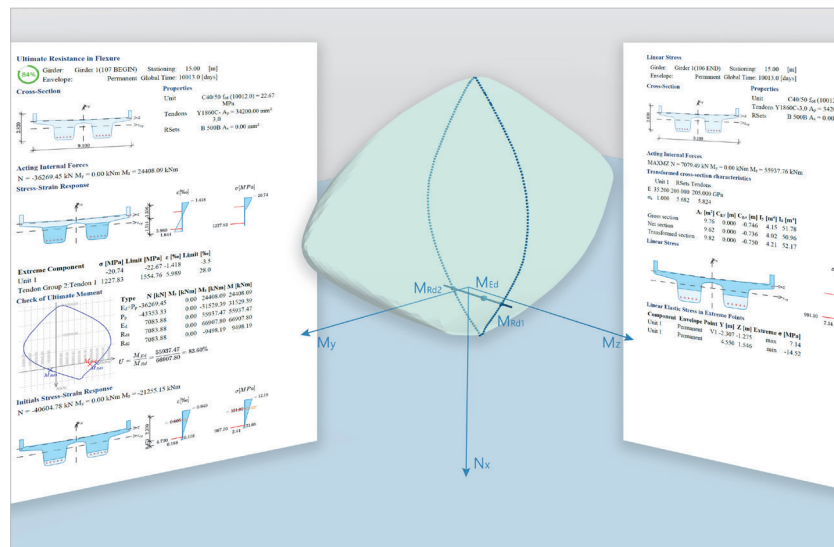


EFFICIENT WORKFLOW WITH ALLPLAN BRIDGE



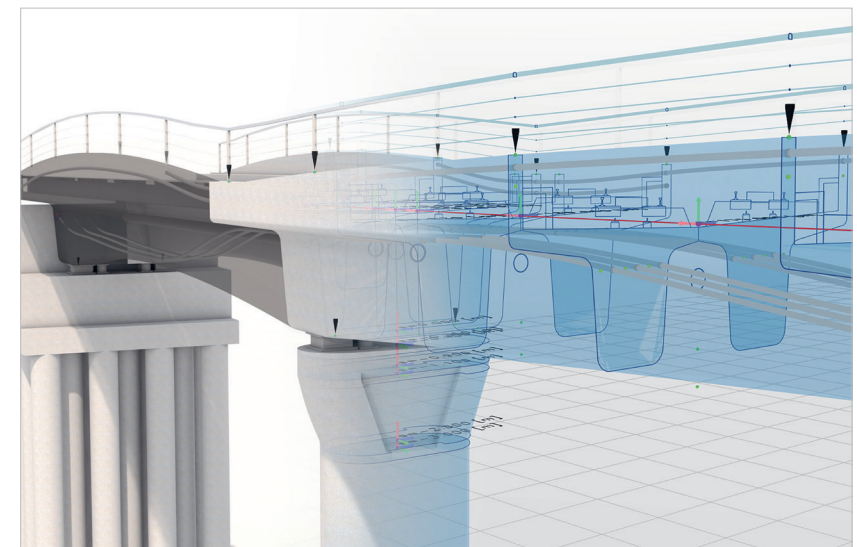
15. CODE BASED DESIGN

Design of necessary reinforcement area is based on both ULS and SLS requirements. Governing combinations of internal forces including 2nd order effects are checked against flexural, torsional and shear resistance and the requirements for stress limitations and crack width. The greater of calculated or any manually specified reinforcement amount is used for code assessments of the cross-sections.

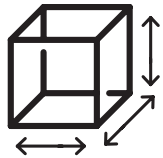


16. PARAMETRIC POSITIONING

To add details such as lamp posts or anchor bodies to the model, Allplan Bridge allows objects from the Allplan library to be referenced. The objects are automatically aligned and adapted each time the bridge geometry is changed.

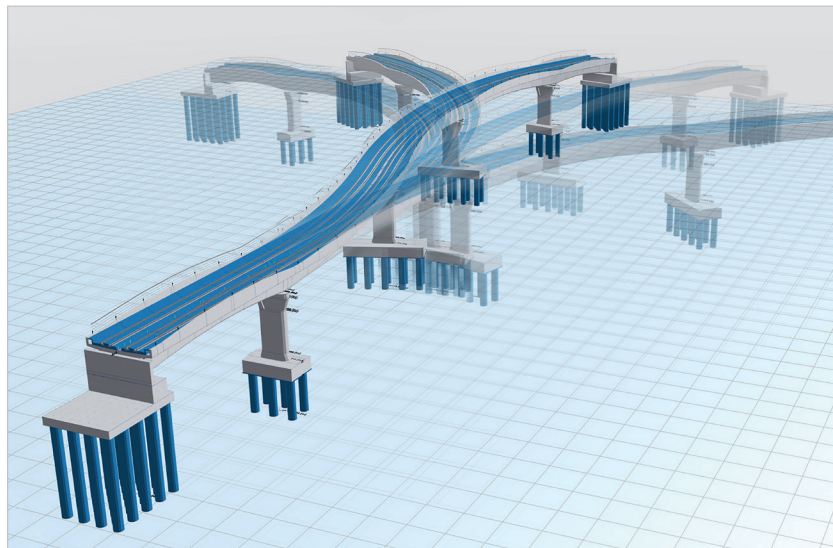


EFFICIENT WORKFLOW WITH ALLPLAN BRIDGE

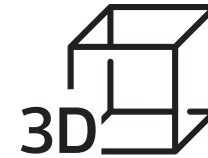


17. IMPLEMENTING CHANGES

The entire 4D model adjusts in the event of any change, such as to the alignment. Hence, if the geometry of an axis changes, the entire bridge model is automatically adjusted. This applies to the analytical model including construction sequence definition and the associated load cases and calculation actions.

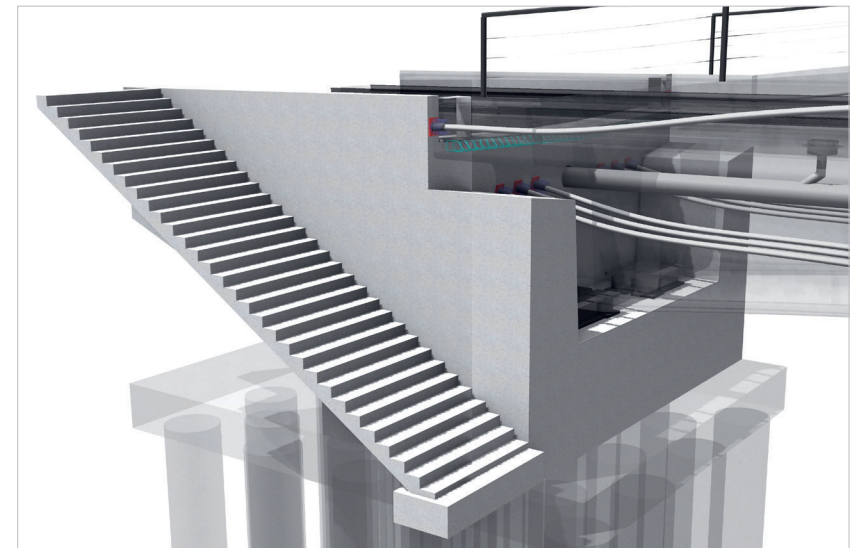


EFFICIENT WORKFLOW WITH ALLPLAN ENGINEERING



18. FREE FORM MODELING

Powerful 3D modeling functionality allows to implement all bridge details without compromise: simply, flexible, and with the highest level of precision. The Parasolid® modeling kernel from Siemens handles intricate free-form geometry based on B-Splines and NURBS as well as for standard tasks such as joints, cut-outs and drainage with ease.

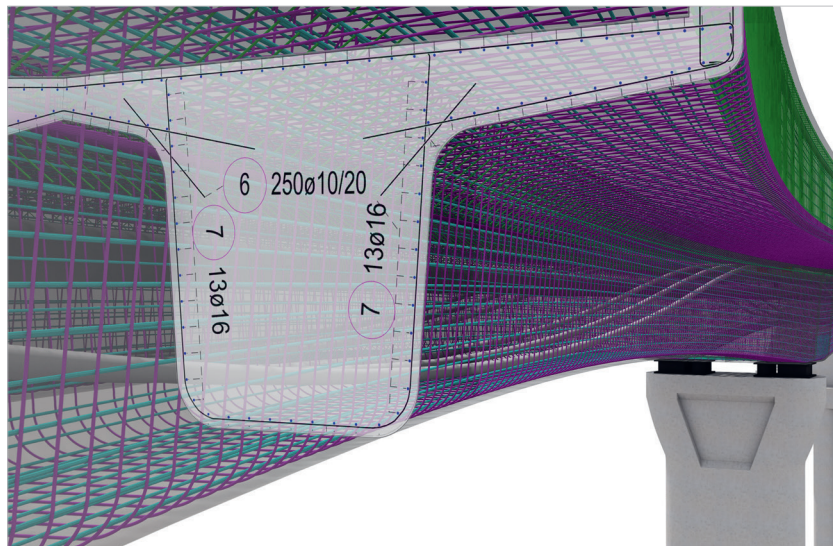


EFFICIENT WORKFLOW WITH ALLPLAN ENGINEERING



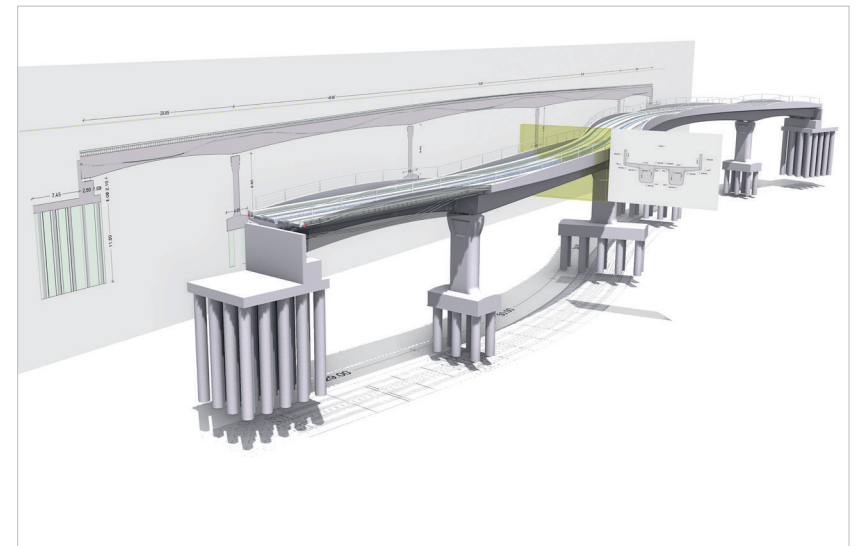
19. REINFORCEMENT MODELING

With Allplan, even challenging bridges with double curvature and varying cross-sections are reinforced conveniently and rapidly. The reinforcement is defined in different cross-sections and the transitions between the cross-sections are described with paths. Various rules can be defined, such as how the reinforcement joints are to be carried out. Using this information, the reinforcement is automatically generated.

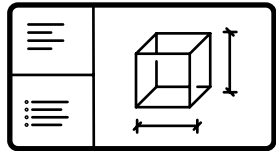


20. CREATE DRAWINGS

Elevations, longitudinal sections along any path and transverse sections are derived from the digital bridge model. CineRender from Maxon is used for realistic visualizations. Allplan's powerful layout and design tools are used to create high-quality construction documentation.



EFFICIENT WORKFLOW WITH ALLPLAN ENGINEERING



21. CREATE REPORTS

The digital bridge model contains a multitude of information. Comprehensive reports with dimensions, areas, volumes, weights and quantities are available at the touch of a button. This also applies to rebar bending schedules.

Concreting work - in-situ concrete

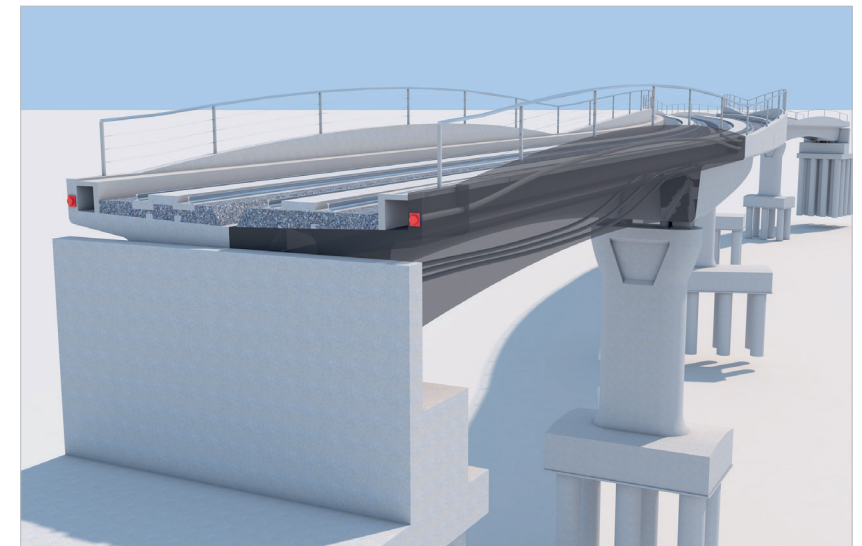
Project: Allplan 2019
 Created by: Allplan Infrastructure
 Date: 18.08.2019
 Note:

Material	Dimensions	Height [m]	Volume [m³]	Total volume [m³]
Superstructure				
CS345				
General 3D Object				
tx		0.726	0.649	0.649
tx		1.423	0.368	0.588
tx		3.820	17.155	
tx		3.820	17.261	17.261
tx		4.907	301.35	301.35
tx		4.907	207.762	207.762
tx		3.820	17.263	17.263
tx		3.820	17.157	17.157
tx		5.196	275.805	275.805
tx		5.196	207.009	207.009

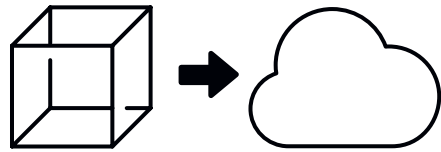


22. INTEROPERABILITY

Allplan Bridge has interfaces to Allplan Engineering and Allplan Bimplus to save the 4D model in many data formats, such as IFC, DWG, DGN or PDF.

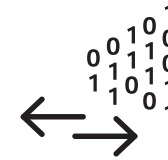
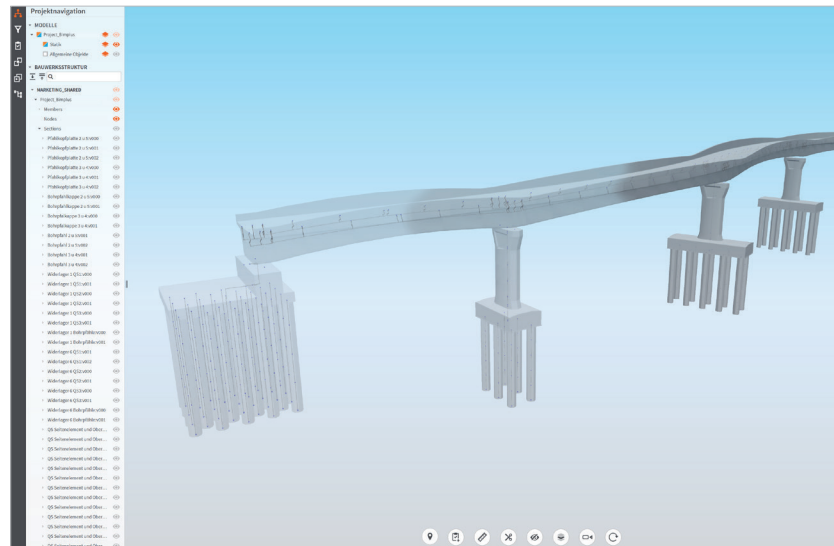


BIM COLLABORATION WITH ALLPLAN BIMPLUS



23. EXCHANGE THE ANALYTICAL MODEL

The analytical model generated in Allplan Bridge can be uploaded to the cloud-based BIM platform Allplan Bimplus. This allows to transfer the analytical model to other structural analysis solutions connected to Allplan Bimplus.

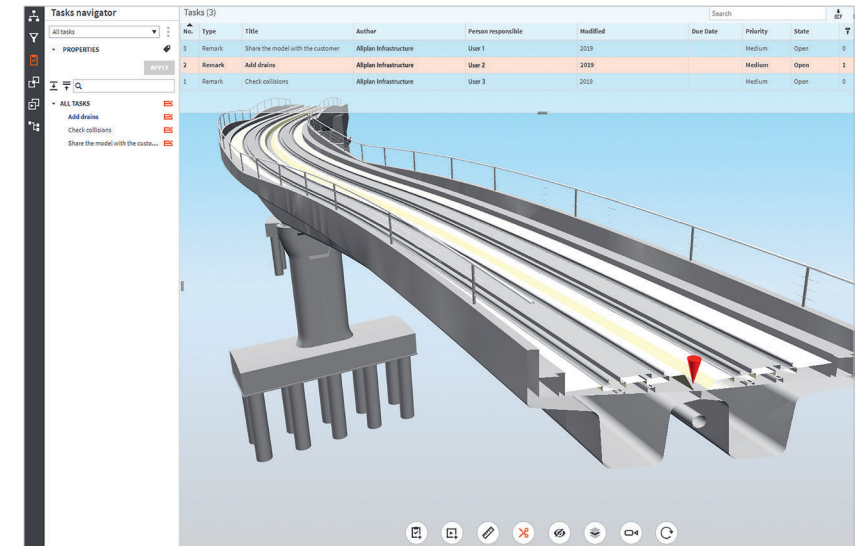


24. BIM COLLABORATION

With the combination of Allplan and the cloud-based BIM platform Allplan Bimplus, everyone project-involved has access to the latest design, anytime, anywhere and with any device. BIM coordination happens interactively on the digital bridge model. Discrepancies are detected at an early stage and resolved jointly. This is an important contribution to ensuring that the construction project is completed on time and within budget.

ALLPLAN BIMPLUS

Try now for free:
allplan.asia/bimplus



ABOUT THE COMPANY

ALLPLAN is a global provider of Building Information Modeling (BIM) solutions for the AEC industry. For more than 50 years ALLPLAN has pioneered the digitalization of the construction industry. Always focused on our clients we provide innovative tools to design and construct projects – inspiring users to realize their visions.

Headquartered in Munich, Germany, ALLPLAN is part of the Nemetschek Group. Around the world over 400 dedicated employees continue to write the ALLPLAN success story.

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