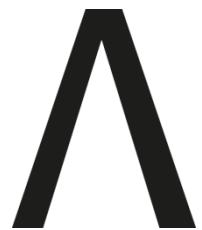


II Foro de Tecnología para la Consultoría de Ingeniería de FEPAC



MODELADO PARAMÉTRICO Y CÁLCULO DE PUENTES CON ALLPLAN BRIDGE

Francisco Javier Padilla Peinado
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E-mail: jpadilla@allplan.com

AGENDA

- 1. GRUPO NEMETSCHEK**
- 2. SOLUCIONES ALLPLAN**
- 3. FLUJO DE TRABAJO CON ALLPLAN BRIDGE**
- 4. MODELADO PARAMÉTRICO**
- 5. CÁLCULO DE PUENTES**

$$2x + 2y = 20$$

$$2^{\text{th}}$$

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1. GRUPO NEMETSCHEK

ALLPLAN ES PARTE DEL GRUPO NEMETSCHEK

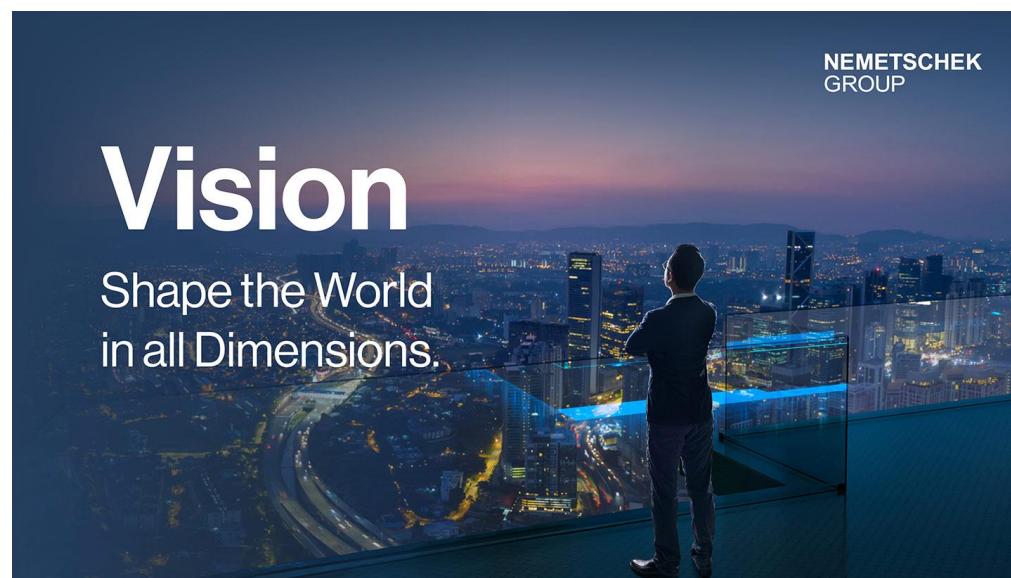
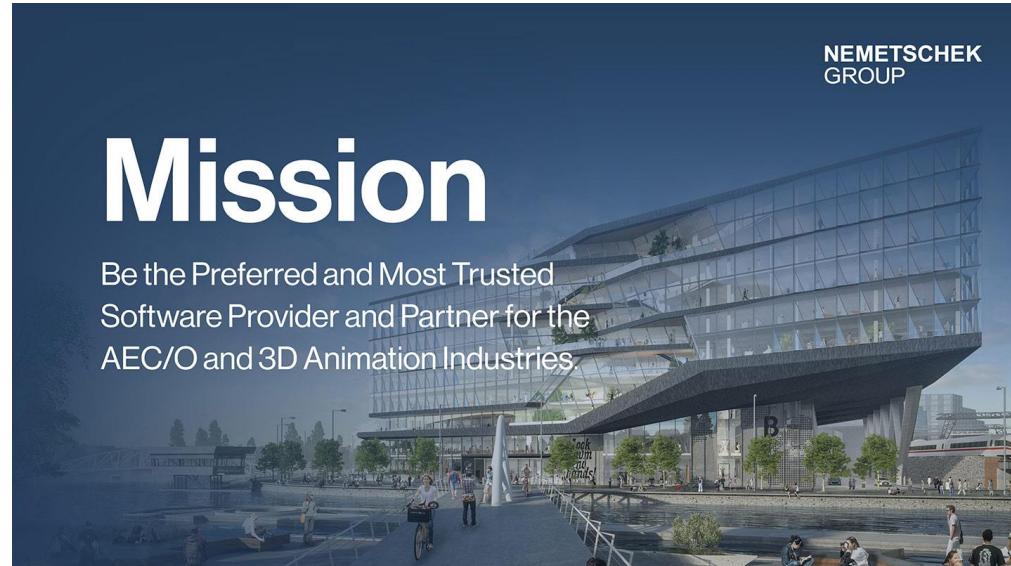


$$2x + 2y = 20$$

$$2$$

Tanto las marcas del grupo Nemetschek como sus soluciones están estableciendo nuevos estándares para el sector AEC.

- Más de 60 años de innovación
- Pionero y proveedor de 5D
- 13 marcas consolidadas
- 4 millones de usuarios en todo el mundo
- IPO 1999, cotiza en el TecDax
- €802 millones ventas (2022)
- Más de 3.400 empleados
- 18% crecimiento ventas (2021)
- €5.508 millones capital mercado



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2. SOLUCIONES ALLPLAN

SOLUCIONES ALLPLAN



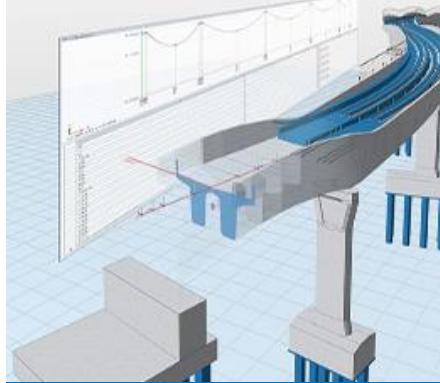
ARQUITECTURA

Solución para arquitectos desde el diseño conceptual hasta el diseño muy detallado



INGENIERIA

Diseño y detalles de estructuras con múltiples materiales (hormigón, acero, madera, mixtas)



INFRAESTRUCTURAS

Modelado, cálculo, diseño y detalles de puentes, modelado y trazado de carreteras, modelado de estructuras de ingeniería civil



PREFABRICADO

Herramienta para el modelado, detalles y fabricación de elementos prefabricados de hormigón



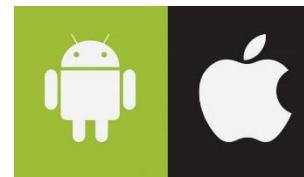
CONSTRUCCIÓN

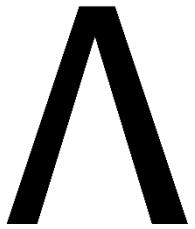
Solución para preparación y organización de obra

ALLPLAN – Solución para todo el sector AEC

BIMPLUS – OPEN BIM

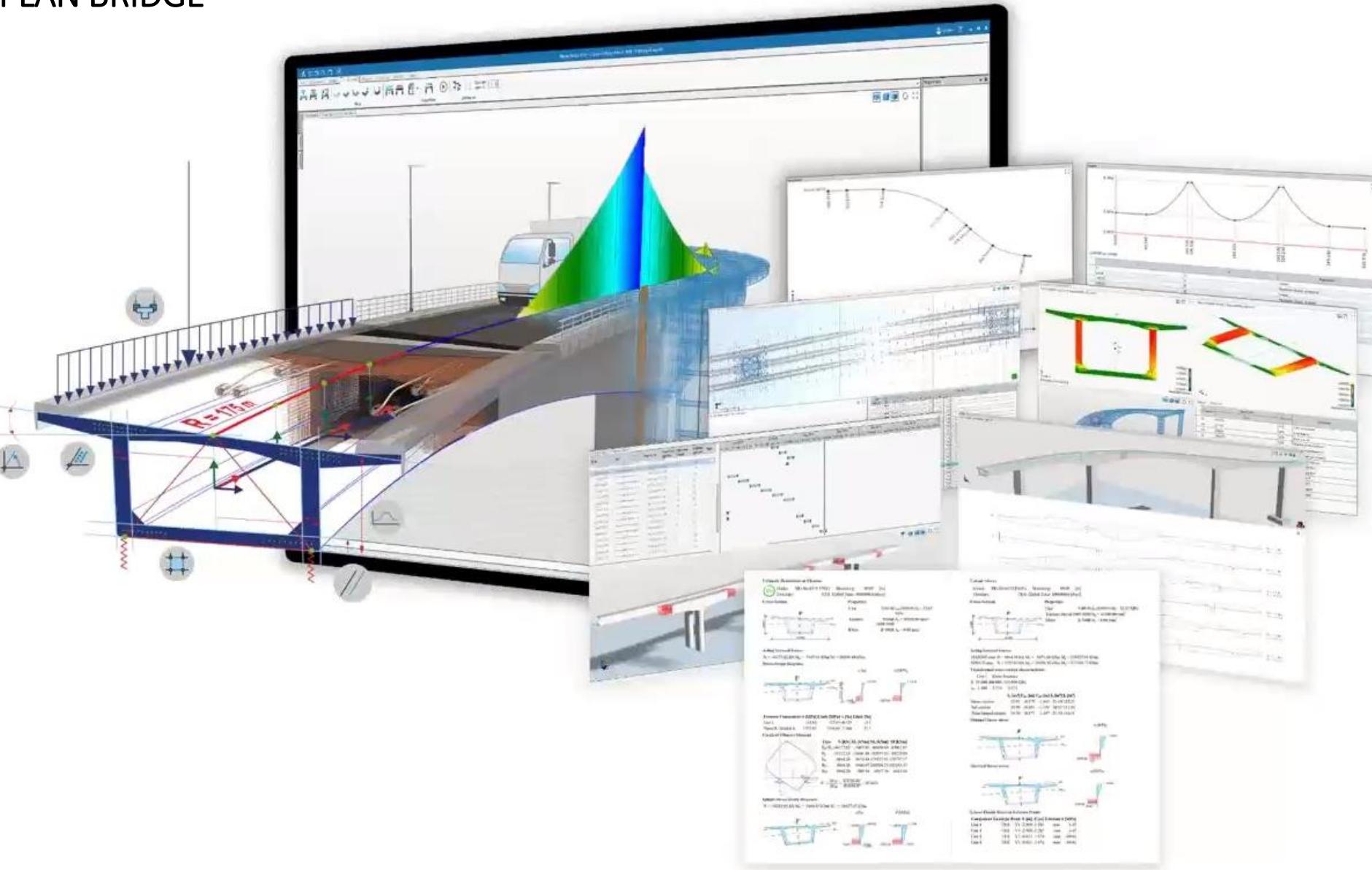
The screenshot shows the BIMPLUS dashboard interface. On the left, a sidebar lists navigation items: Dashboard, Projects, Project members, Models, Documents, BIM Explorer, Revision compare, Schedule viewer, Export manager, Energy simulation, Team members, Property manager, and Visit store. The main area displays a 3D model of a skyscraper, a map of New York City with a red marker, and various project details. A central box shows the current project is 'Tower' at 'Alpin GmbH' with a start date of 'January 24, 2013' and an end date of 'July 24, 2018'. It includes a contact section with name, telephone, mobile phone, and email. To the right, there's a 'Dashboard' section with a video icon, a map of New York, and a 'Tasks' section showing a pie chart and bar graphs.





3. FLUJO DE TRABAJO CON ALLPLAN BRIDGE

\ ALLPLAN BRIDGE

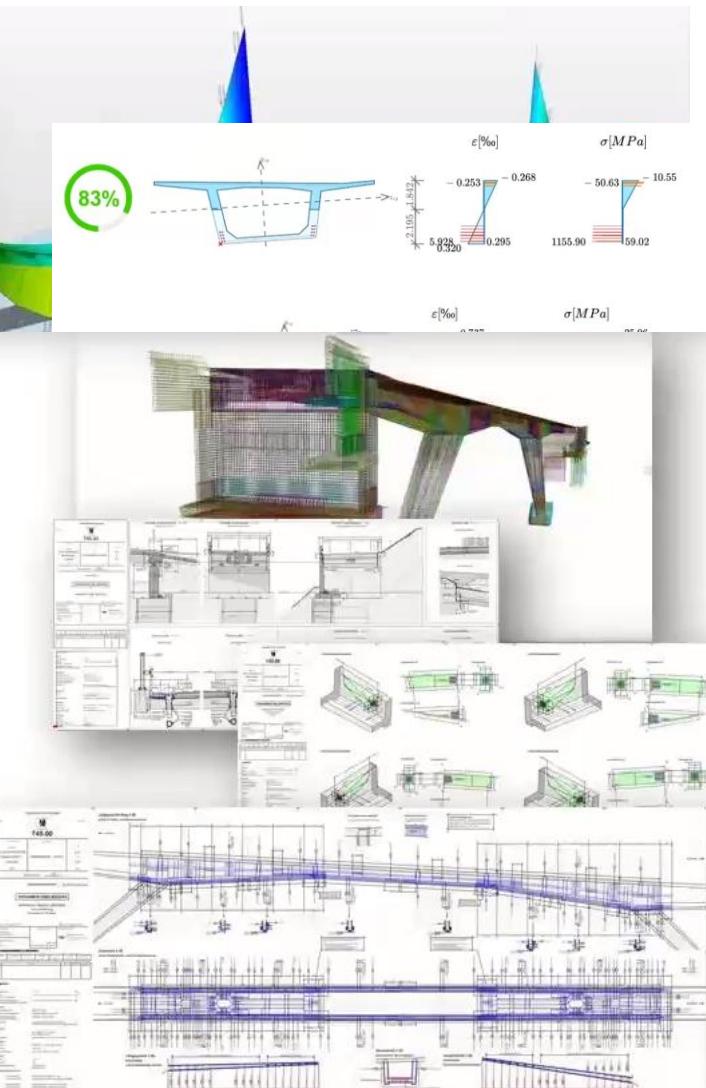
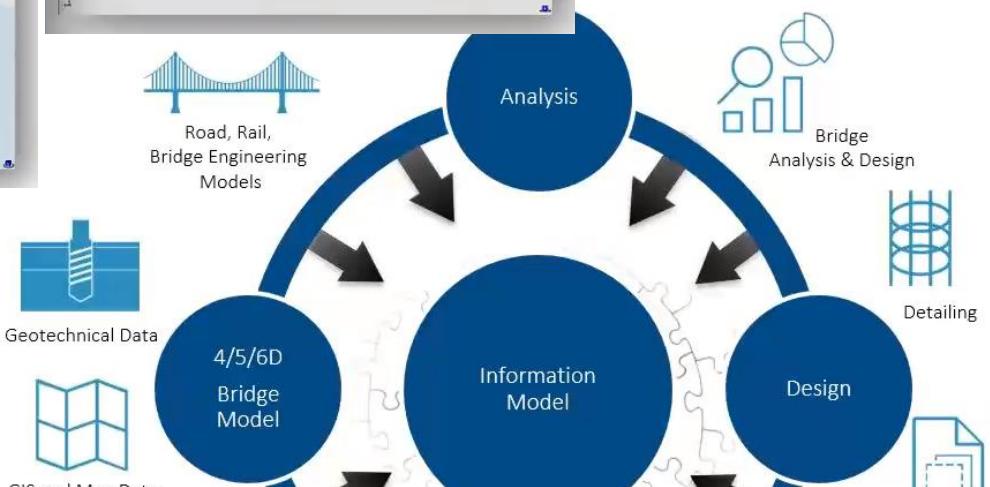
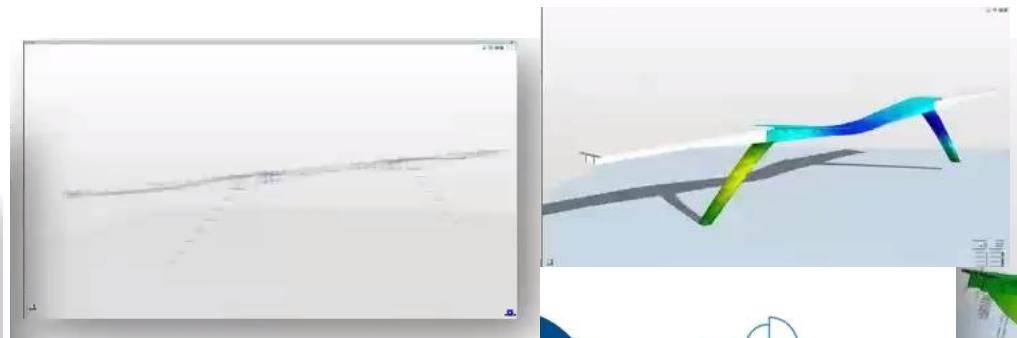
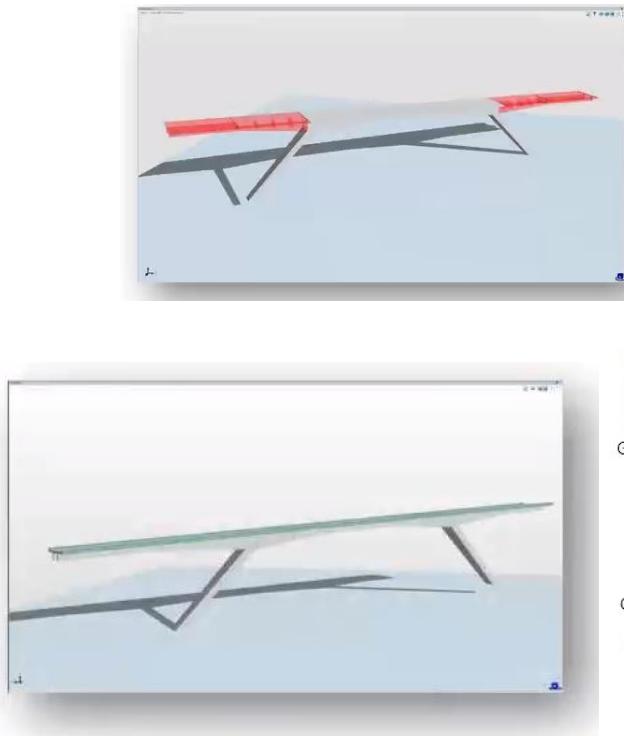


$$2x + 2y = 20$$

$$2^{\circ}$$

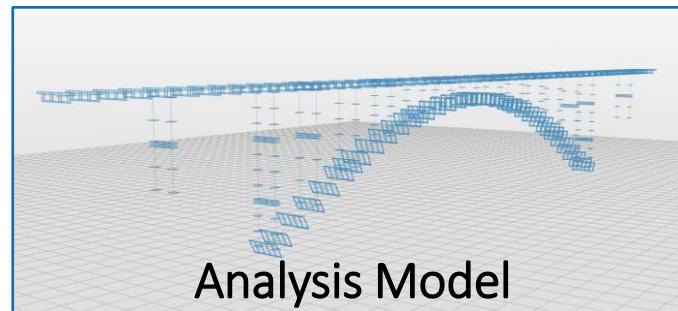
A

\ MODELADO, ANÁLISIS Y PLANOS (DETALLES) EN UNA SOLA SOLUCIÓN BIM



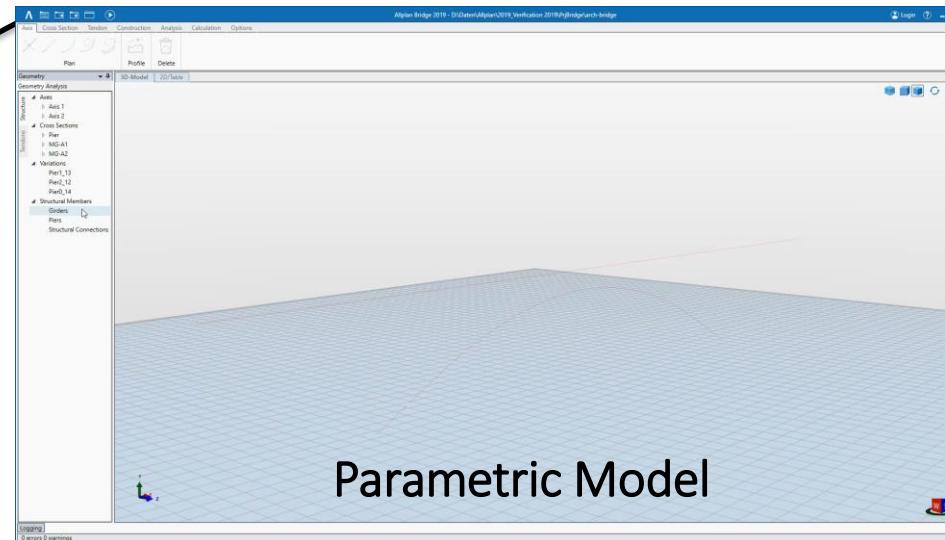
$$2x + 2y = 20$$

ALLPLAN BRIDGE UN SOLO MODELO

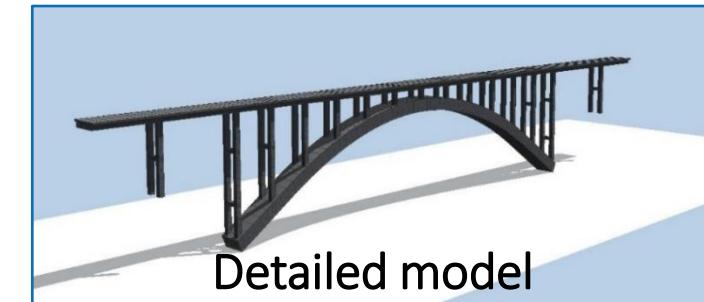


Analysis Model

Structural Analysis



Parametric Model



Detailed model

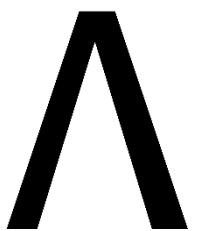
Detailing, Drafting, Deliverables^{2D}



$$2x + 2y = 20$$

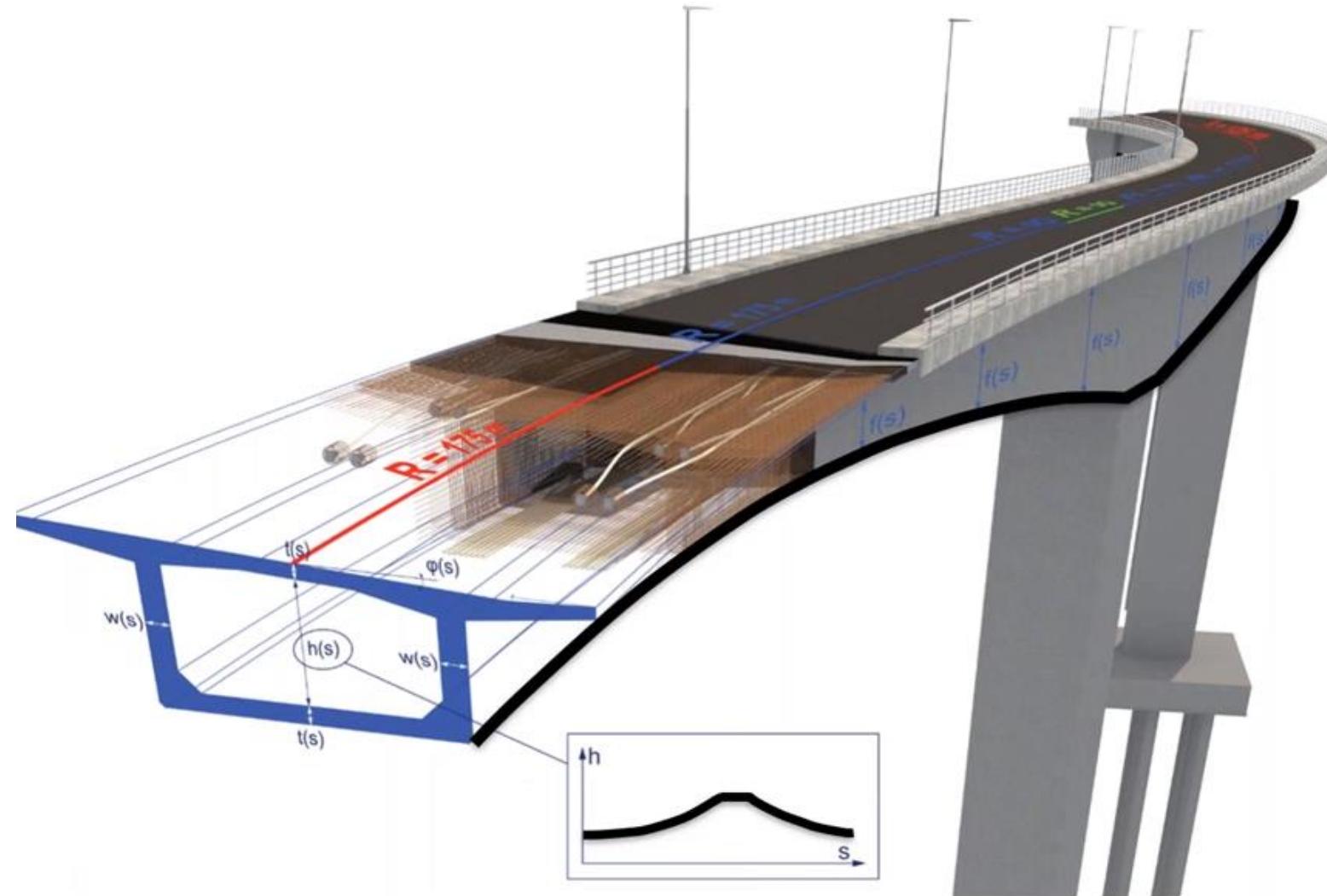
2

= 90



4. MODELADO PARAMÉTRICO

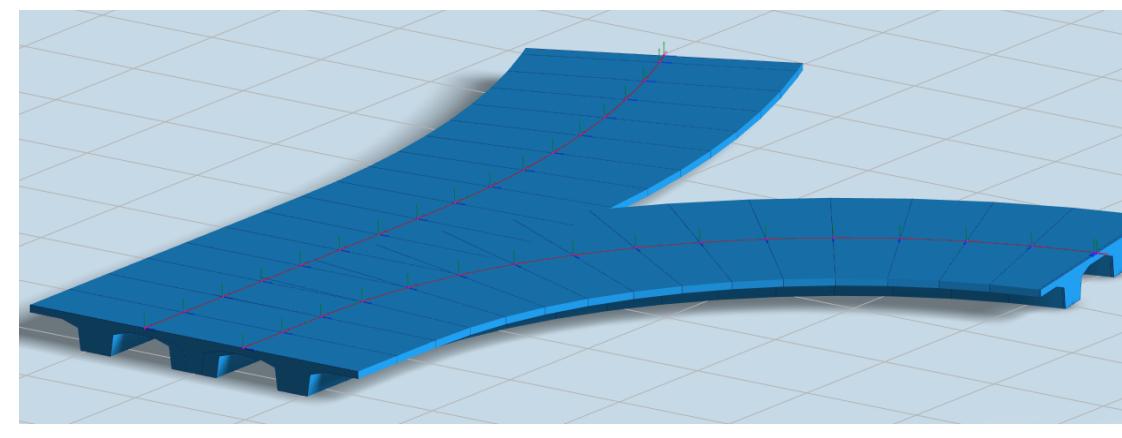
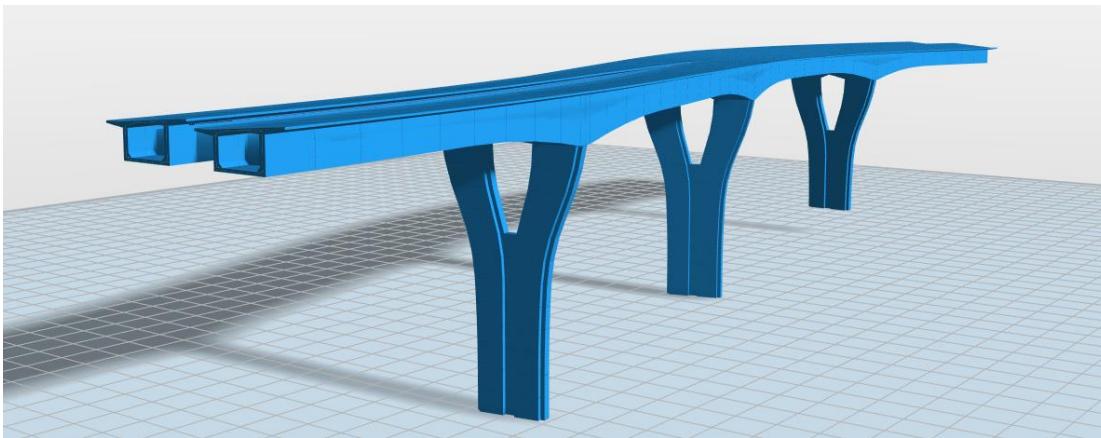
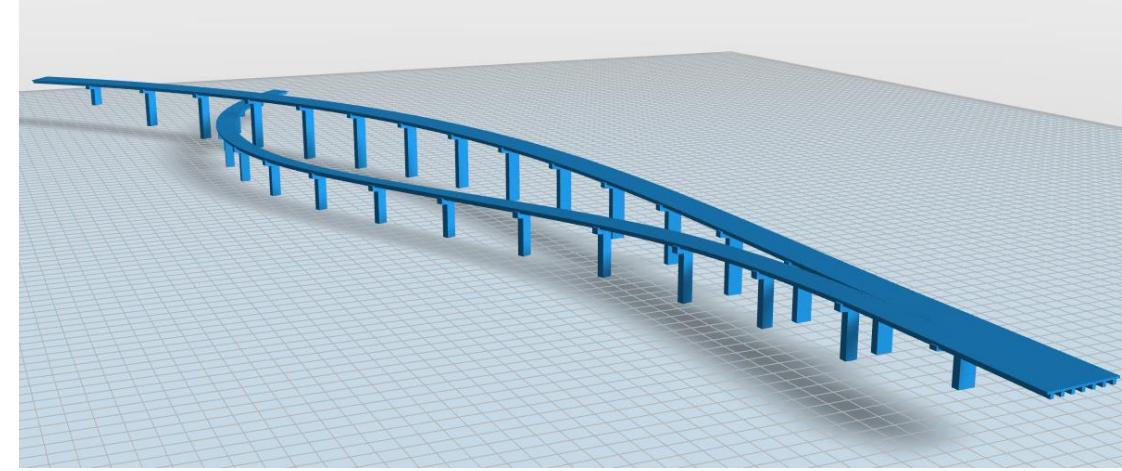
- › Modificaciones posibles en cualquier momento, incluso con el modelo geométrico acabado
- › Elementos paramétricos:
 - › EJES
 - › SECCIONES TRANSVERSALES
 - › VARIACIONES



$$2x + 2y = 20$$

$$2^{\text{th}}$$

CUALQUIER TIPOLOGÍA Y FORMA



$$2x + 2y = 20$$

$$2$$

$$l_1 - l_2$$

\ ALLPLAN BRIDGE

A



$$2x + 2y = 20$$

$$2^{\text{th}}$$

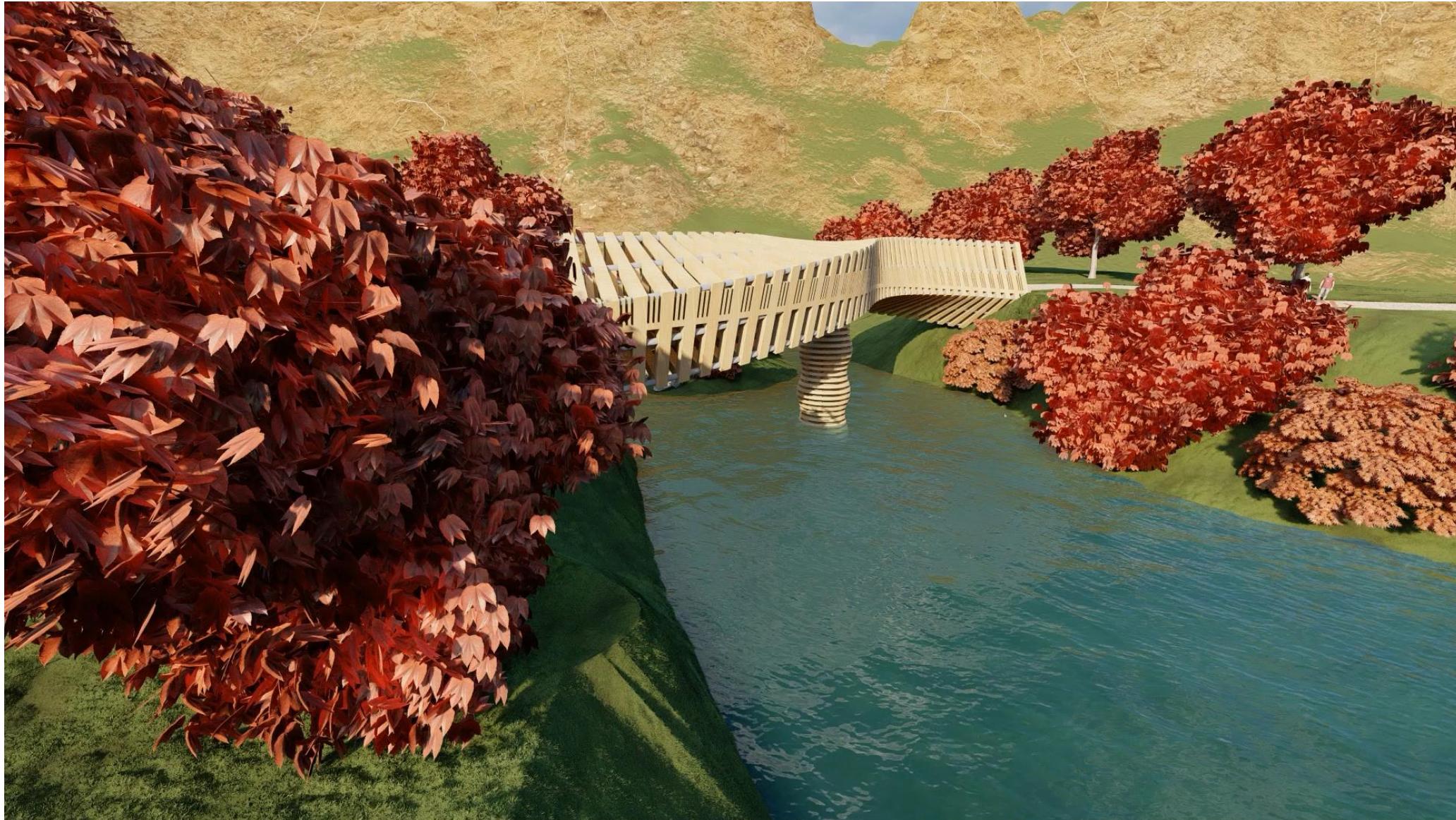
\ BRIDGE: MODELADO DE ALTA CALIDAD

A



\ BRIDGE: MODELADO DE ALTA CALIDAD

A



$$2x + 2y = 20$$

$$2^{\text{th}}$$

\ ALLPLAN BRIDGE MODELER



FÁCIL MANEJO DE CAMBIOS - EJES

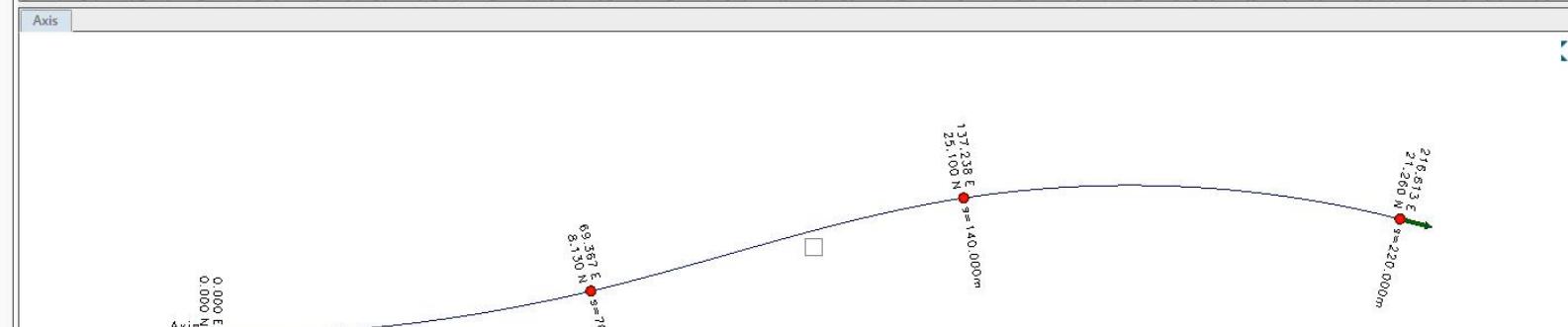
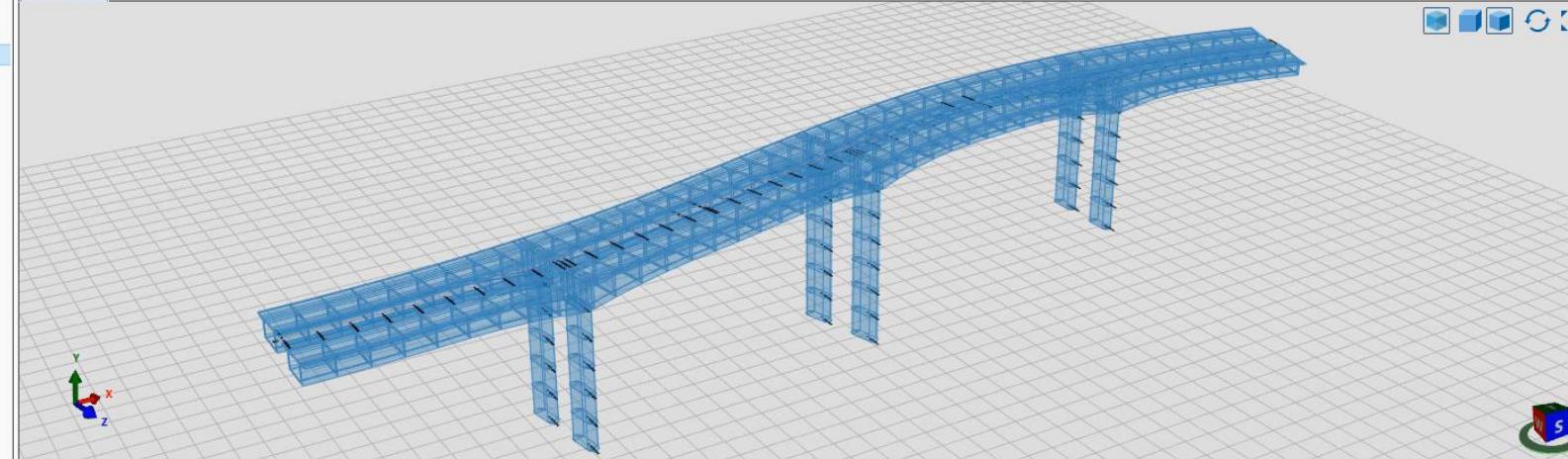
Allplan Bridge 2019 - \\AIMLE001\\allplan_2019\\PrjBridge\\Double curved

Axis Cross section Tendon Analysis Calculation Options

Plan Profile Delete

Project Navigation

- Structure
 - Axes
 - Axis
 - Axis Plan
 - Tendons
 - Layers
- Cross Sections
- Pier
- Variables
 - wpier
 - hpier
- MG
 - Variables
 - hsection
 - webwidth
 - bthickness
 - incl
 - inclLeft
 - inclRight
 - webwidth_half
 - bthickness_half
- Variations
 - hsection
 - bthickness
 - webwidth
 - incl
 - wpier
 - inclLeft
 - inclRight
- Structural Members
 - Girders
 - MG
 - Piers
 - Pier 1-1
 - Pier 1-2
 - Pier 1-3
 - Pier 2-1
 - Pier 2-2
 - Pier 2-3
- Structural Connections

- Properties


Logging

0 errors 0 warnings



\ ALLPLAN BRIDGE MODELER



FÁCIL MANEJO DE CAMBIOS EN GEOMETRÍA

Allplan Bridge 2019 - \\AIMLE0001\allplan_2019\PjBridge\Double curved

Login ? x

Axis Cross section Tendon Analysis Calculation Options

Plan Profile Delete

Project Navigation

- Axes
- Axis
- Axis Plan
- Profile

Cross Sections

- Pier
- Variables
- wpier
- hpier

MG

- Variables
- hsection
- webwidth
- bthickness
- incl
- inclLeft
- inclRight
- webwidth_half
- bthickness_half

Variations

- hsection
- bthickness
- webwidth
- incl
- wpier
- inclLeft
- inclRight

Structural Members

- Girders
- MG

Piers

- Pier 1
- Pier 2
- Pier 3
- Pier 4
- Pier 5
- Pier 6

Structural Connections

3D-Model

Properties

General	hsection
Name	Section height
Description	Type
Table	X constant
	Y constant

hsection

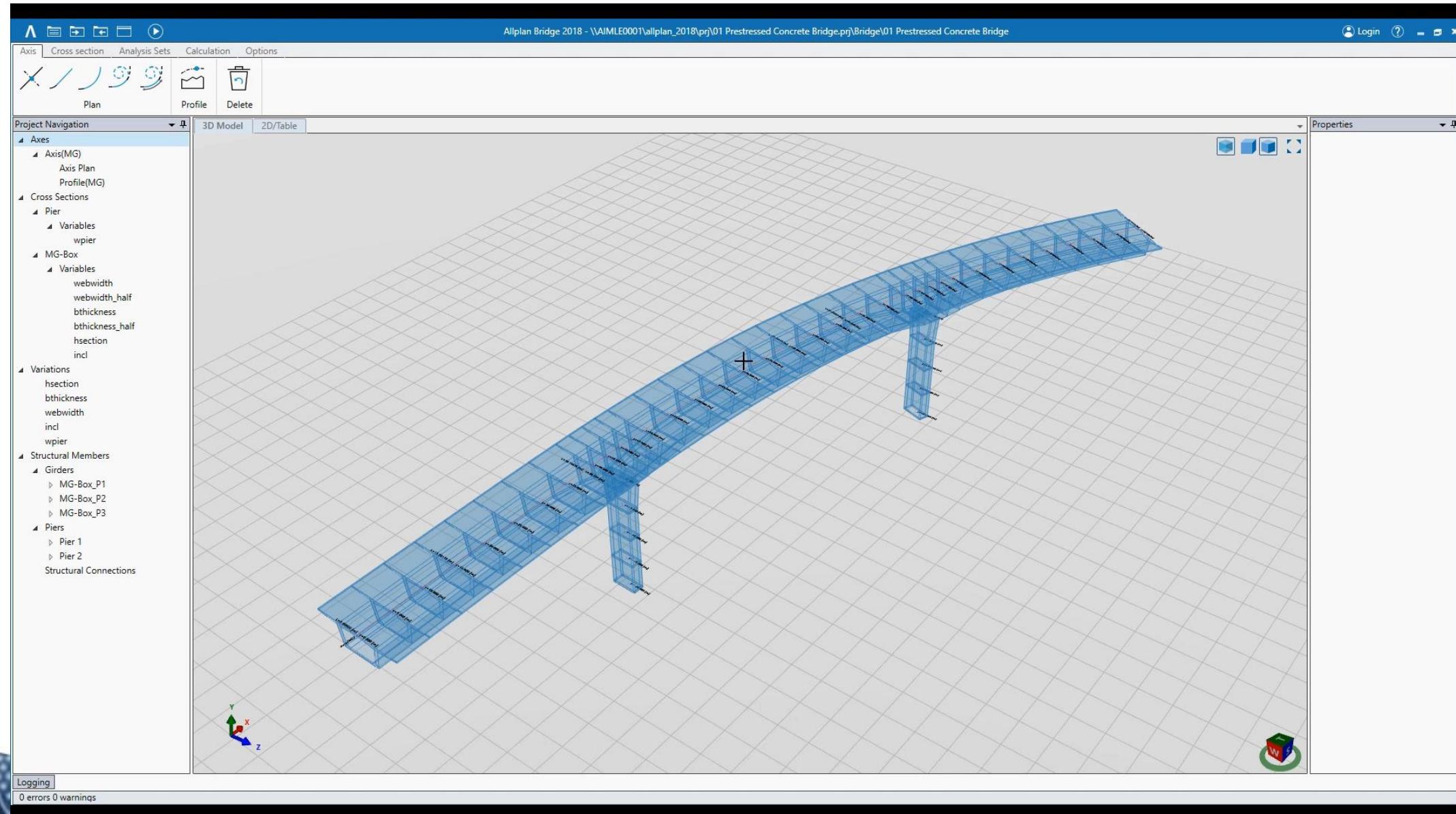
Transition

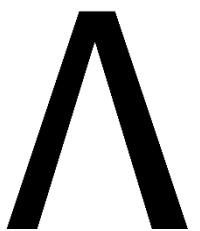
	X	Y	
> 0	3.5	3.5	Linear
24	3.5		Parabolic (horiz. at begin)
44	3.5		Linear
46	3.5		Parabolic (horiz. at end)
66	3.5		Linear
89	3.5		Parabolic (horiz. at begin)
109	3.5		Linear
111	3.5		Parabolic (horiz. at end)

Logging

0 errors 0 warnings

DISEÑO DE ARMADURAS



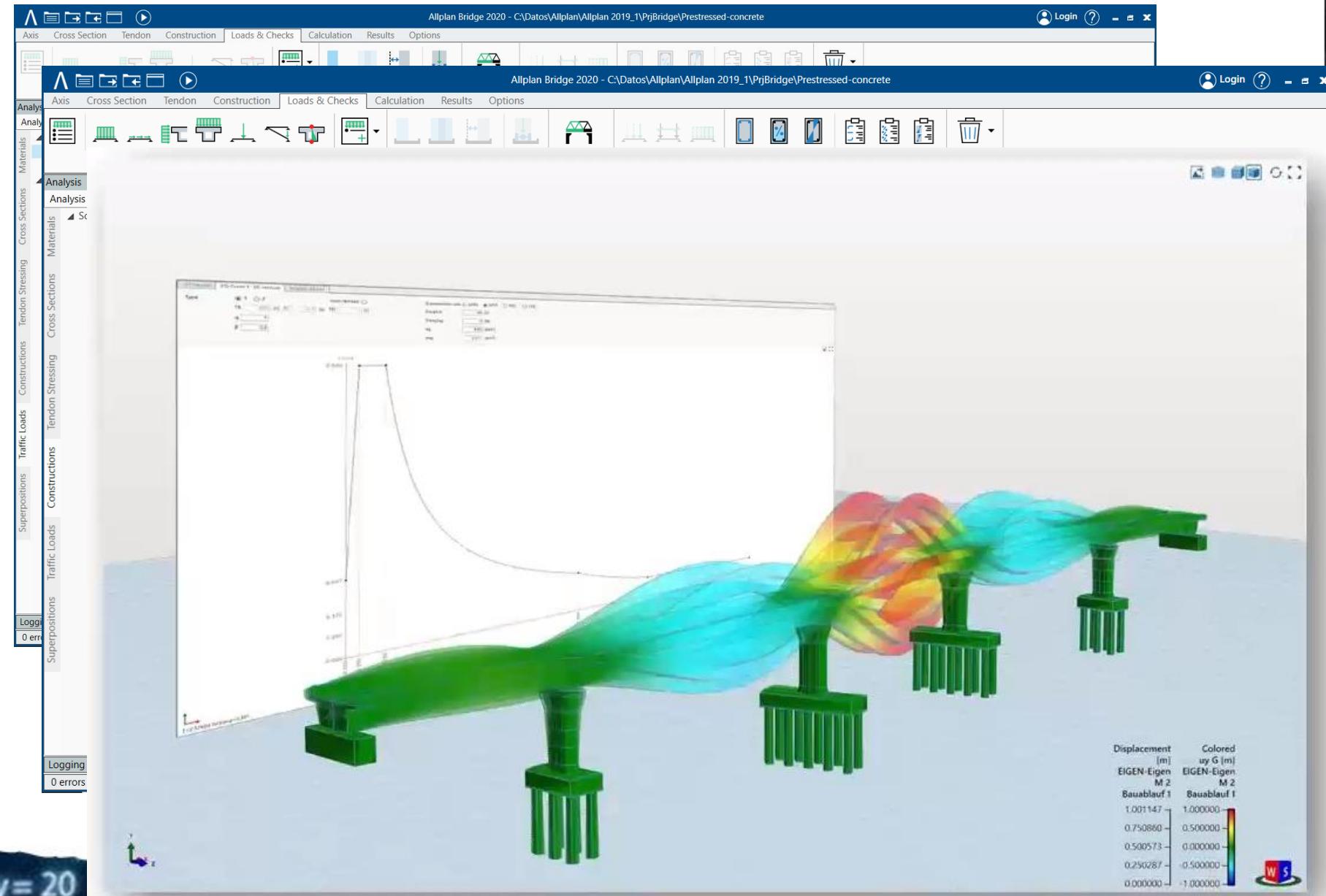


5. CÁLCULO DE PUENTES

\ DEFINICIÓN DE CARGAS



- > TRÁFICO
- > TEMPERATURA
- > ASIENTOS DIFERENCIALES
- > ACCELERACION / FRENADO
- > VIENTO
- > CARGAS PUNTUALES NUDOS
- > CARGAS DISTRIBUIDAS
- > SÍSMICAS



\ HIPÓTESIS Y COMBINACIONES



- ✓ Grupos
- ✓ Tipos de combinación
- ✓ Filtros

Allplan Bridge 2021@20200901-0015 - C:\Daten\Allplan\2021_Verification 2021\ProjBridge\Prestressed-concrete

Login ?

Analysis Materials Tools Cross-Section 3D Modeling Tendon Construction Loads & Checks Calculation Results Options

Tasks Assemblies Construction Loads Assemblies Animation

Days per second: 1

Combination Table 1

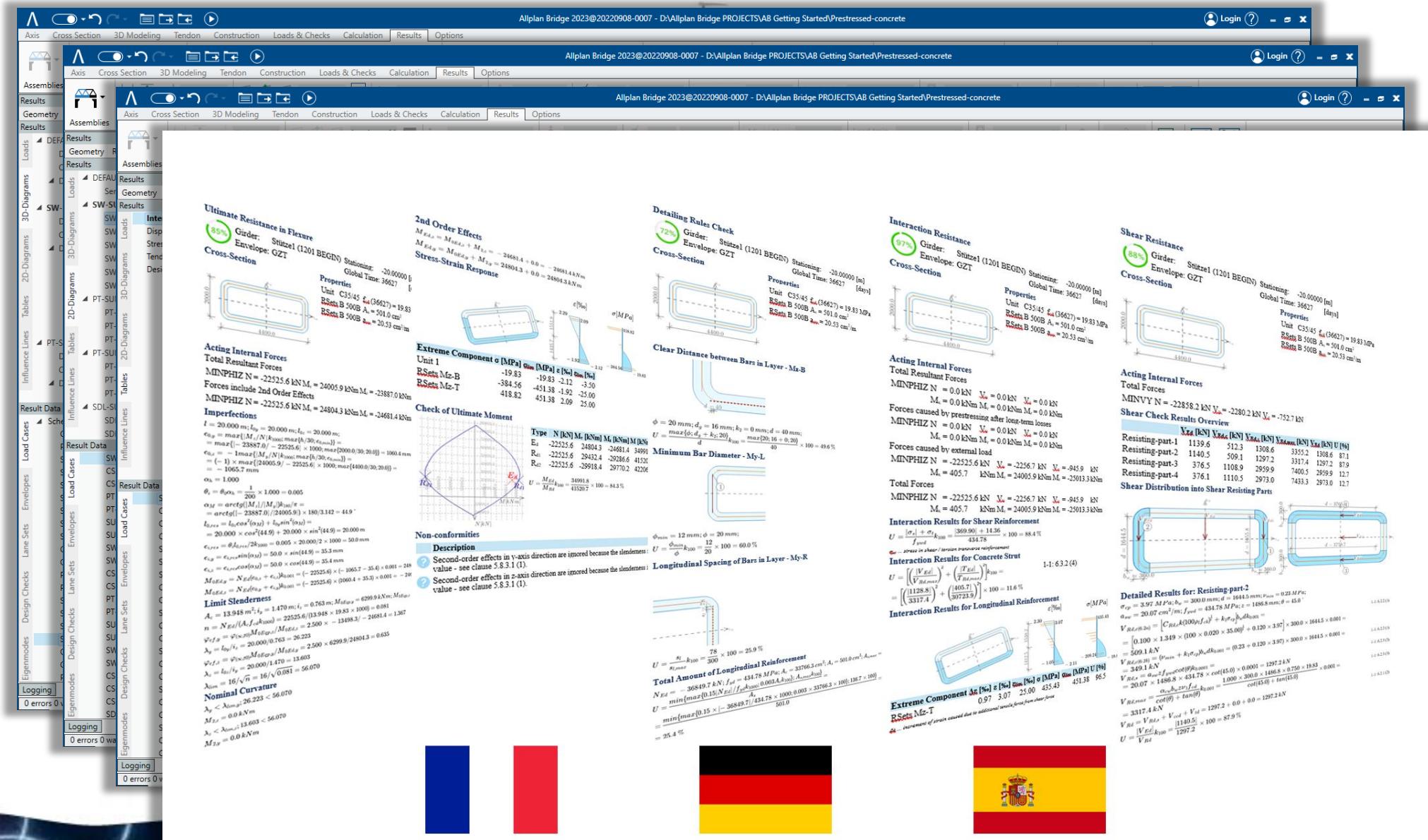
No.	Name	Type	Loadcase/Envelope:		Permanent Loads		Pre-stressing U:		Time Effects		Settlement:		Variable Loads		Name	Groups
			Unfav.	Favor	Unfav.	Favor	Unfav.	Favor	Unfav.	Favor	Unfav.	Favor	Unfav.	Favor		
1	C1_0<0	Characteristic	1	1	1	1	1	1	1	1	1	1	1	1	C1_0<0	
2	C2_1=0	Characteristic	1	1	1	1	1	1	1	1	1	1	1	1	C2_1=0	
3	C3_t=0	Characteristic	1	1	-1	1	1	1	1	1	1	1	1	1	C3_t=0	
4	C4_wim	Characteristic	1	1	1	1	1	1	1	1	0.75	0.75	0.4	0.4	C4_wim	
5	C5_wim	Characteristic	1	1	1	1	1	1	1	1	0.75	0.75	0.4	0.4	C5_wim	
6	C6_tem	Characteristic	1	1	1	1	1	1	1	1	0.75	0.75	0.4	0.4	C6_tem	
7	C7_Tem	Characteristic	1	1	1	1	1	1	1	1	0.75	0.75	0.4	0.4	C7_Tem	
8	C8_t=0	Frequent	1	1	1	1	1	1	1	1	0.75	0.75	0.4	0.4	C8_t=0	
9	C9_t=0	Frequent	1	1	1	1	1	1	1	1	0.75	0.75	0.4	0.4	C9_t=0	
10	C10_Wi	Frequent	1	1	-1	1	1	1	1	1	1	1	1	1	C10_Wi	
11	C11_Wi	Frequent	1	1	1	1	1	1	1	1	1	1	1	1	C11_Wi	
12	C12_Ter	Frequent	1	1	-1	1	1	1	1	1	1	1	1	1	C12_Ter	
13	C13_Ter	Frequent	1	1	-1	1	1	1	1	1	1	1	1	1	C13_Ter	
14	C14_t=0	Quasi-permanent	1	1	1	1	1	1	1	1	1	1	1	1	C14_t=0	
15	C15_t=0	Quasi-permanent	1	1	1	1	1	1	1	1	1	1	1	1	C15_t=0	
16	C16_t=0	ULS	1.35	1	1.35	1	1	1	1	1.2	1.35	1.35	1.35	1.35	0.9	
17	C17_t=0	ULS	1.35	1	1.35	1	1	1	1	1.2	1.013	1.013	0.54	0.54	C17_t=0	
18	C18_t=0	ULS	1.35	1	1.35	1	1	1	1	1.2	1.35	1.35	1.35	1.35	0.9	
19	C19_t=0	ULS	1.35	1	1.35	1	1	1	1	1.2	1.013	1.013	0.54	0.54	C19_t=0	
20	C20_Wi	ULS	1.35	1	1.35	1	1	1	1	0	1.2	0	1.013	1.013	C20_Wi	
21	C21_Wi	ULS	1.35	1	1.35	1	1	1	1	1	1.2	0	1.013	1.013	C21_Wi	
22	C22_Ter	ULS	1.35	1	1.35	1	1	1	1	0	1.2	0	1.013	1.013	C22_Ter	
23	C23_Ter	ULS	1.35	1	1.35	1	1	1	1	1.2	0	1.013	1.013	0.54	0.54	C23_Ter
24	C24_0<	ULS	1.35	1	1.35	1	1	1	1.35	1	1	1	1	1	C24_0<	
25	C25_LM	Fatigue	1	1	1	1	1	1	1	1	1	1	1	1	C25_LM	
26	C26_Ear	Accidental	1	1	-1	1	1	1	1	1	1	1	1	1	C26_Ear	

Click here to add a new row

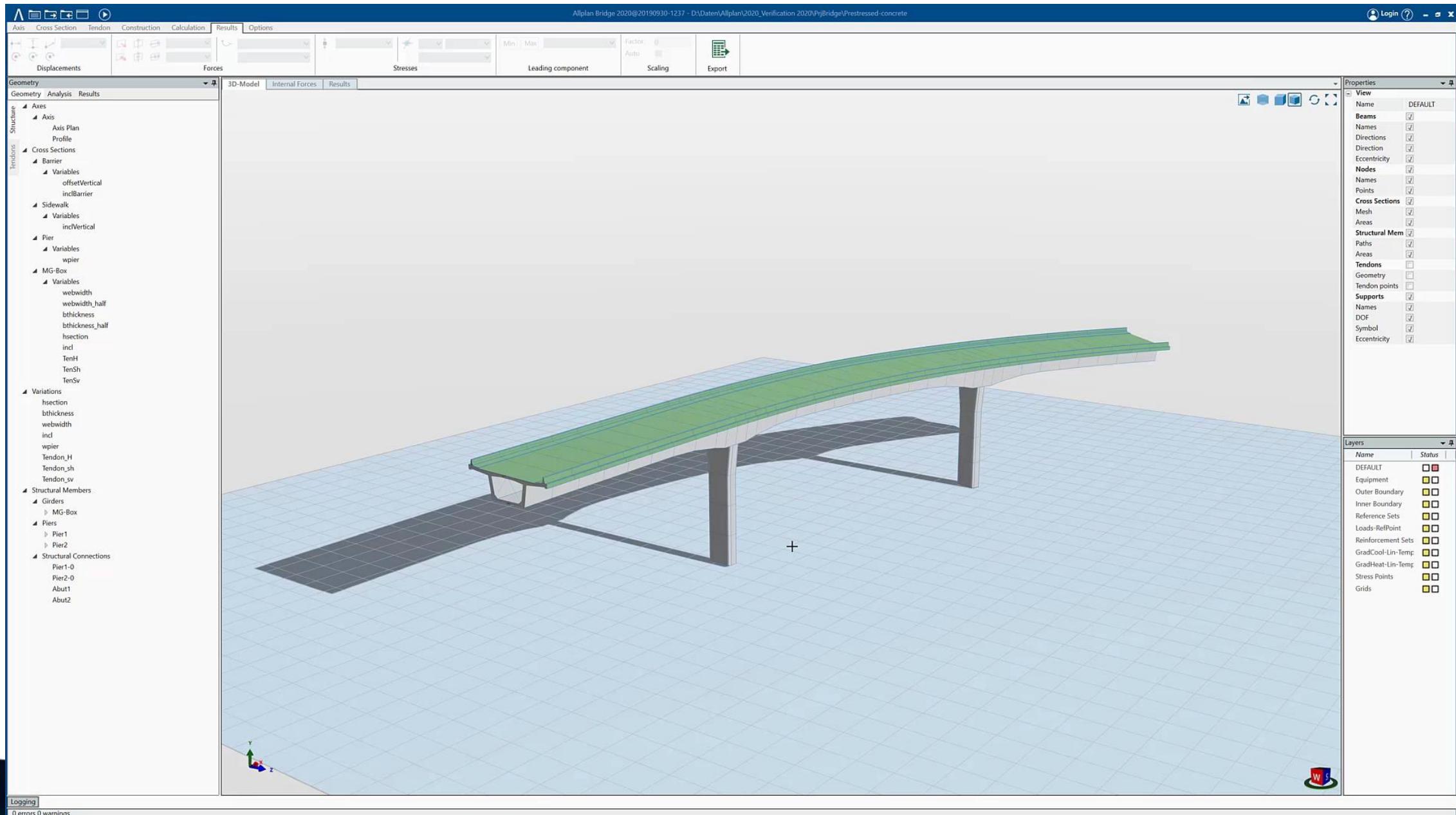
Standard: EN Country: Europe

$$2x + 2y = 20$$

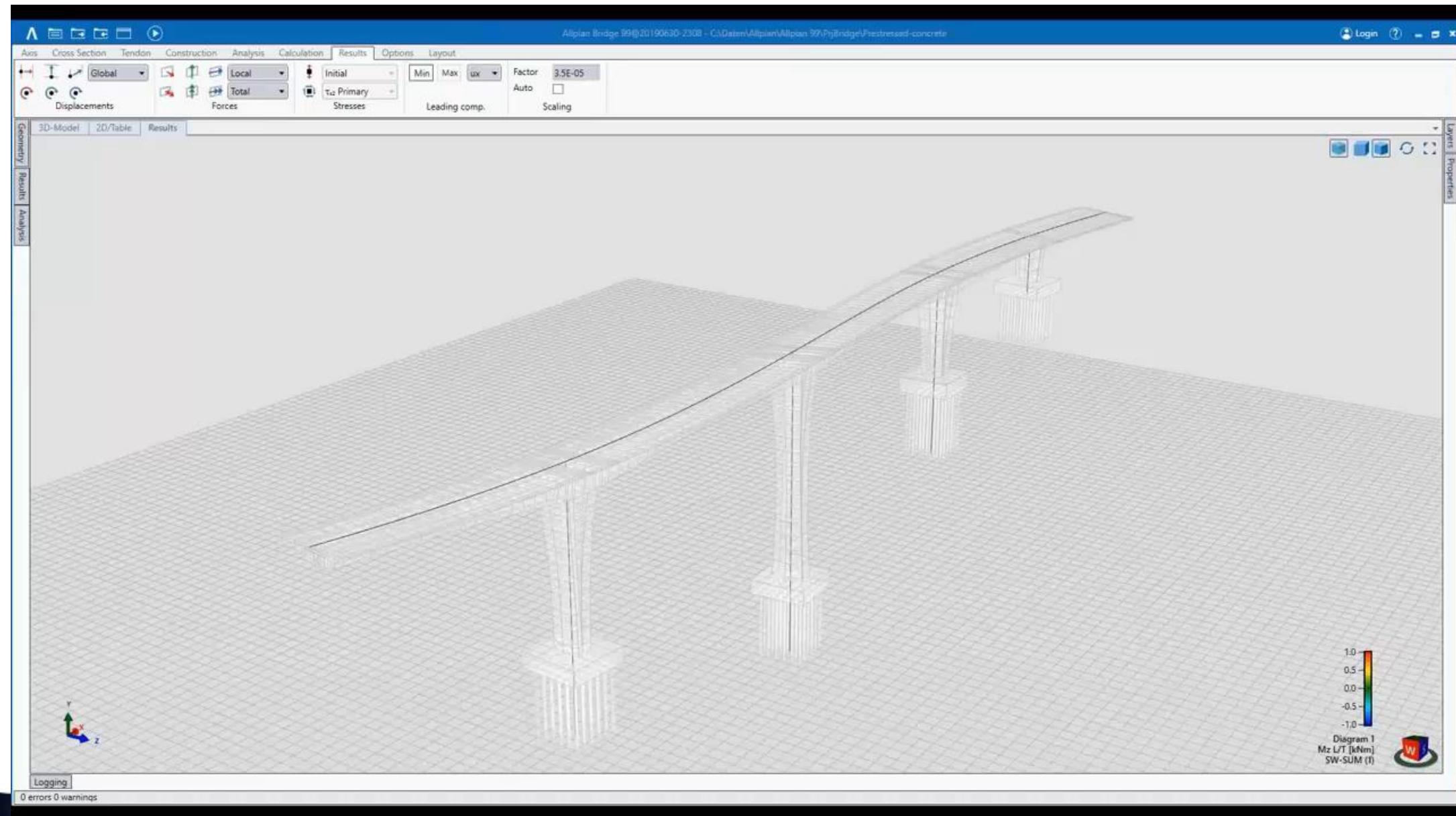
\ RESULTADOS E INFORMES



\ RESULTADOS



\ MODELO ANALÍTICO



$$2x + 2y = 20$$

$$2''$$

ALLPLAN SYSTEMS ESPAÑA S.A.

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E-Mail: jpadilla@allplan.com