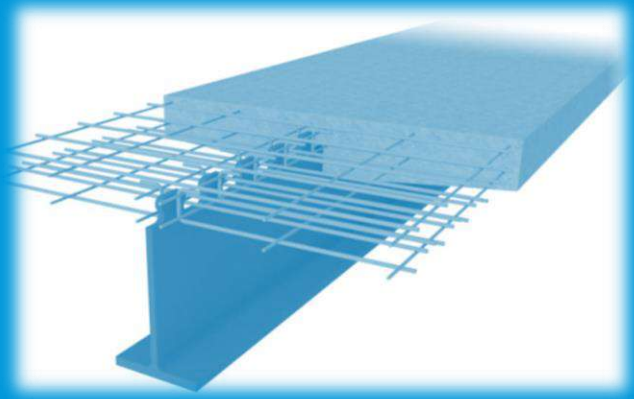
DEZVOLTAREA DE SISTEME PREFABRICATE MODERNE PENTRU PODURI ÎN ROMÂNIA



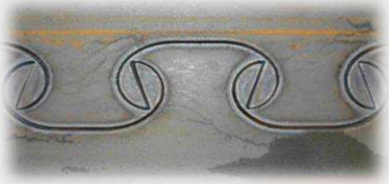
Prin dialog începe totul…
Everything starts with dialogue…
Dialog ist der Anfang von allem…

SSF-RO

RETTER group

Universitatea Politehnica Timișoara

Agenda:

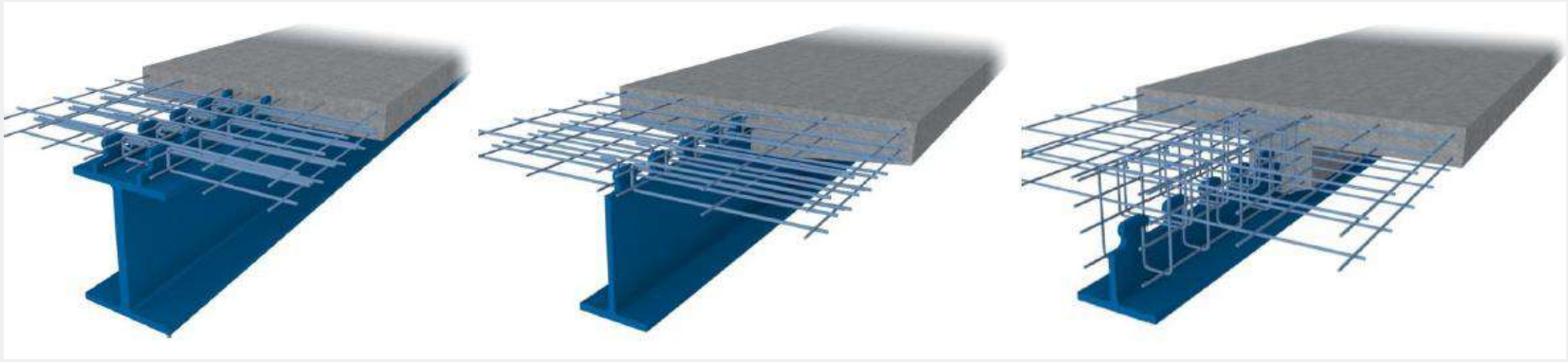


– design of sustainable and durable bridges (VFT-WIB® & VTR®);

– integral structures;

– new construction method basing on innovative composite dowels for the shear transmission;

– examples.



New efficient solutions for bridges. Targets:

– modular system

– simplicity and short execution time

– lower costs

– structural robustness

– facile and cheap to maintain

– reduced environmental impact

Integral structures → Euro bridges

✓ Arch-like bridges have been erected for over 2000 years and represent integral structures.

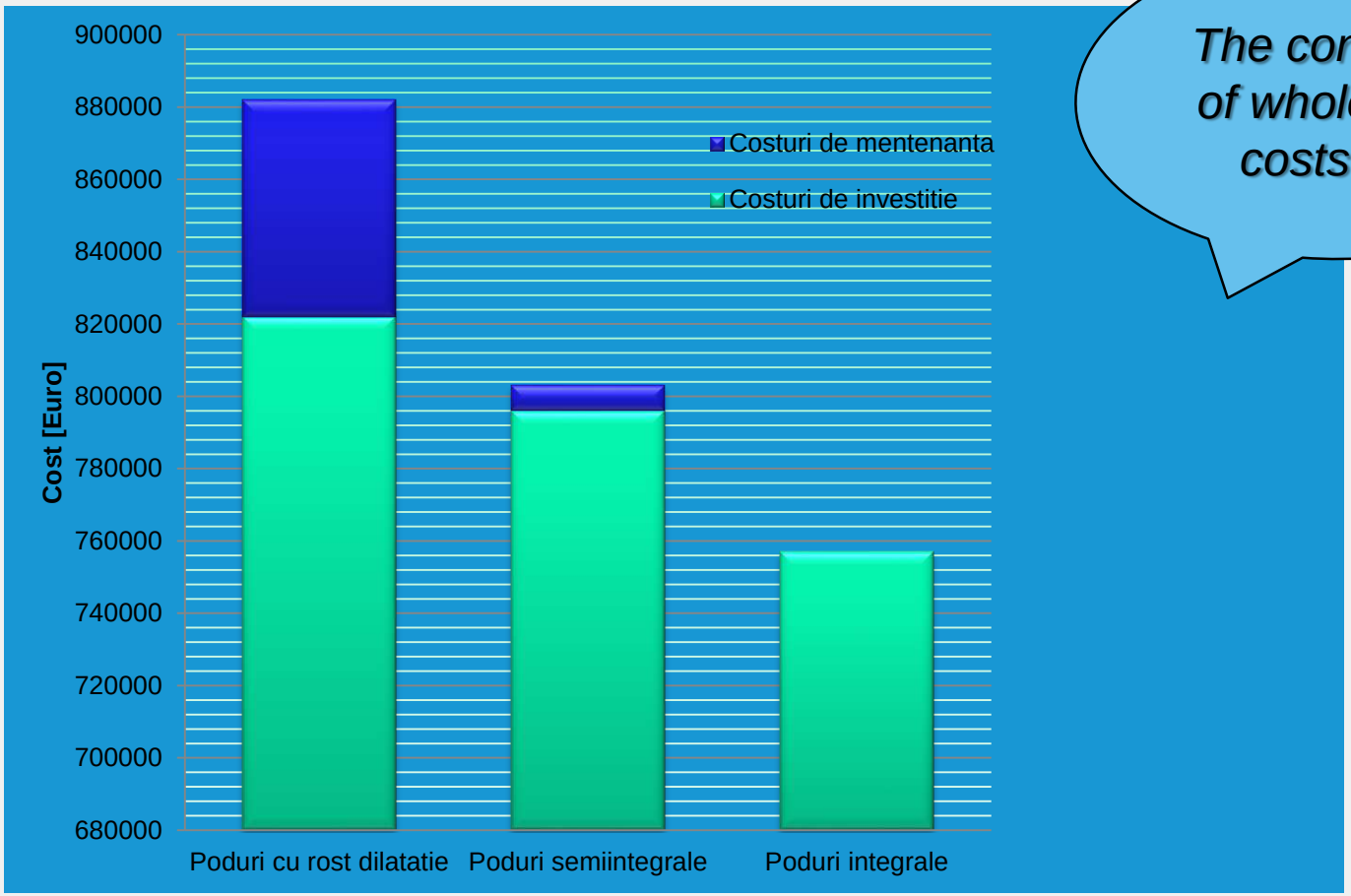
✓ Without a clear distinction between the superstructure and the infrastructure of the bridge.

✓ The abutments and the piers are monolithically connected to the superstructure.

✓ No bearings and expansion joints.

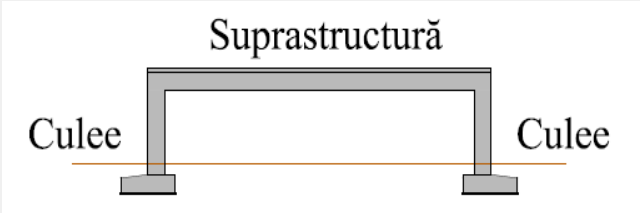
✓ The FRAME structures are the “old arch bridges”.

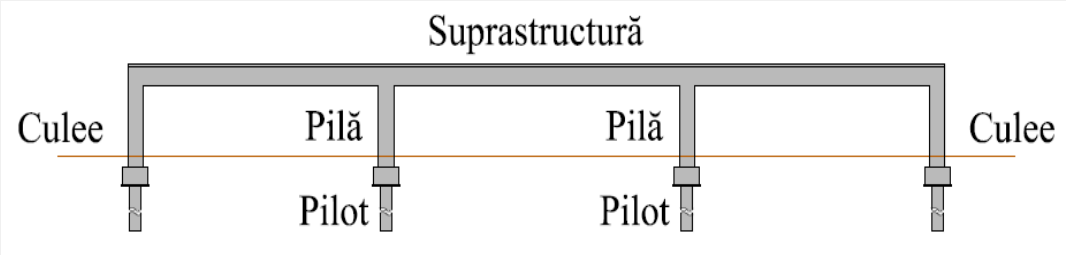
Why these structures? → Maintenance costs

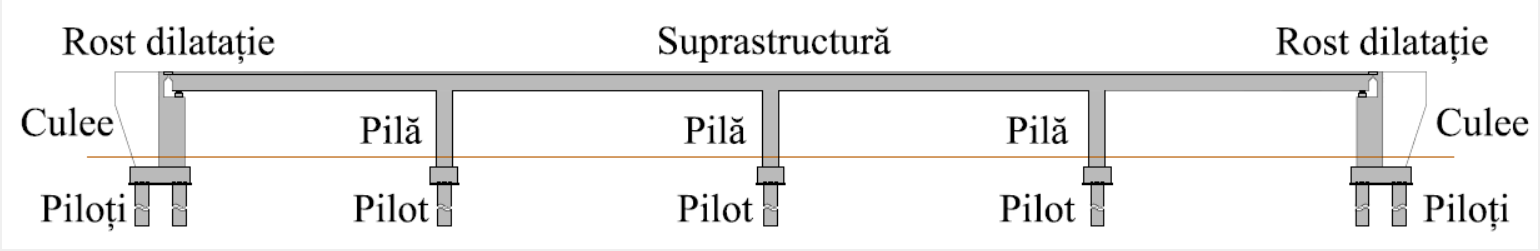


The concept of whole life costs !!!

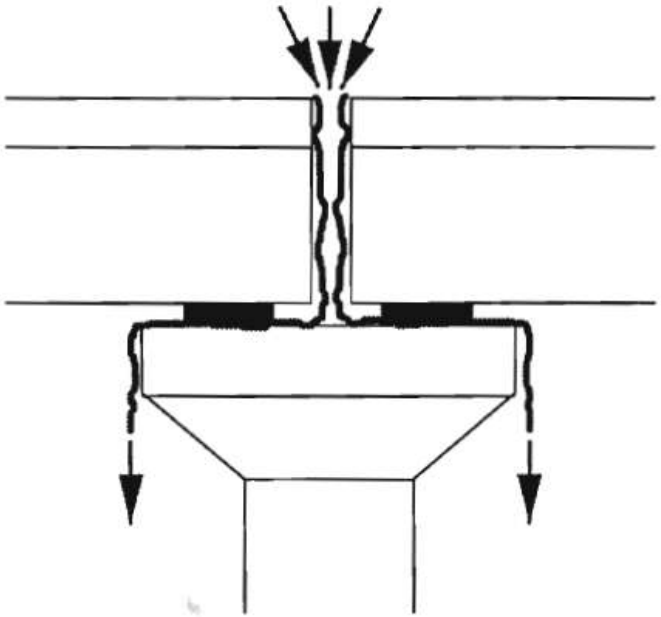
Why these structures? ➡ Maintenance costs

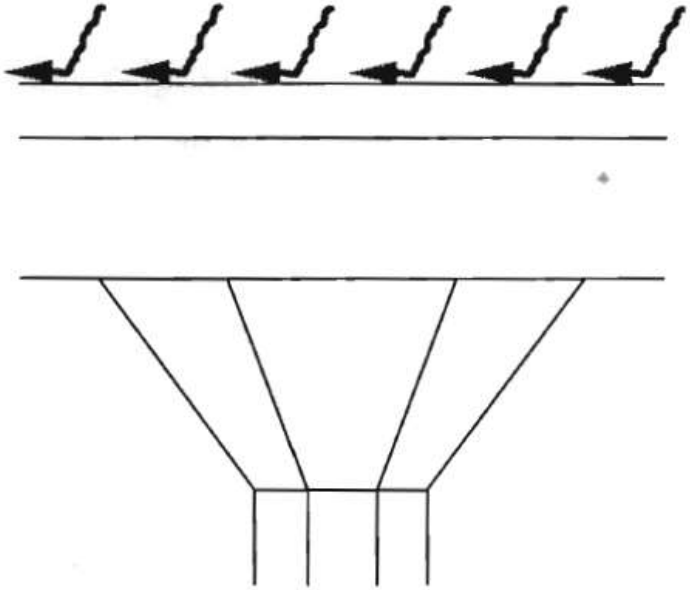






Typical defects



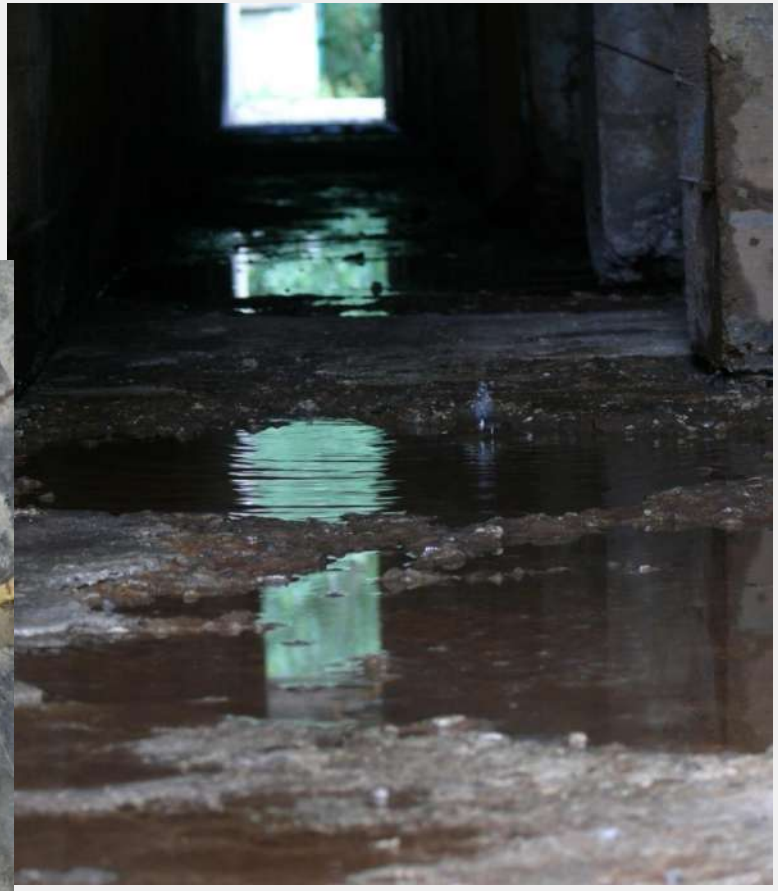


Typical defects

Typical defects

Typical defects

Typical defects



New construction method basing on innovative composite dowels. VFT-WIB® Method

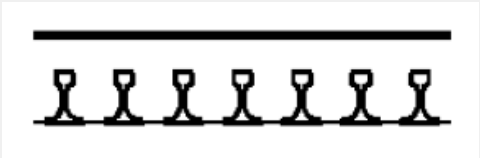
What is VFT-WIB ?

VFT solution = **V**erbund**F**ertigteil**T**räger
Prefabricated composite girder
WIB = Walzträger im Beton
Embedded steel girders

A further development of the concrete bridges with embedded steel girders (WIB – filler beams decks). The VFT-WIB® girder is a prefabricated composite precast part with a T-shaped steel girder as load-bearing element on the underside of the girder.

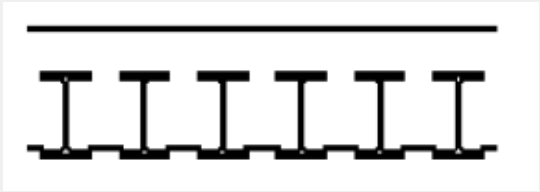
VFT-WIB®

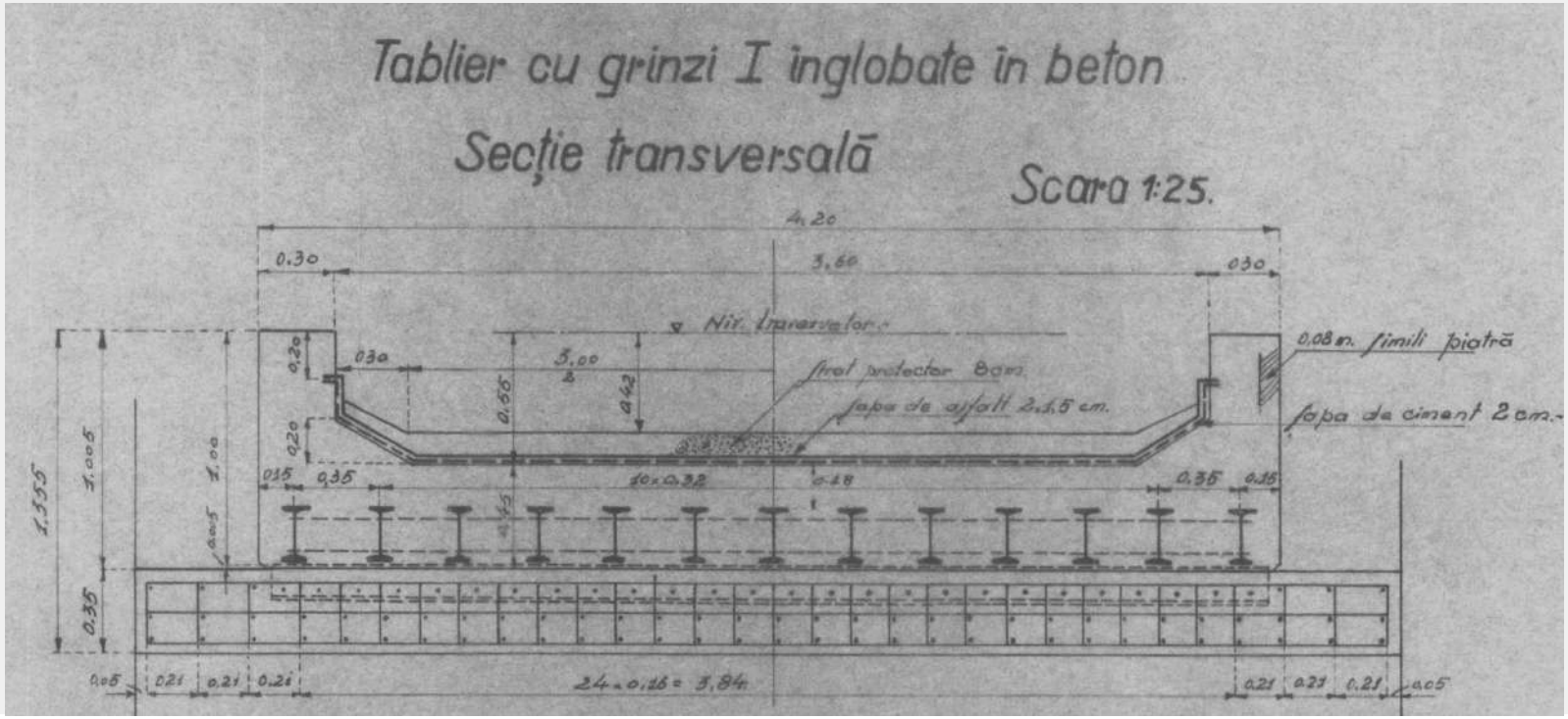
Initial solution -1900



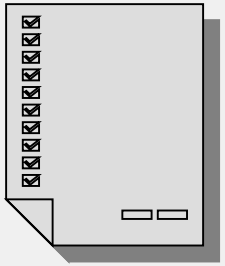
VFT-WIB®

Soluţia G.I.B (WIB) →România 1937

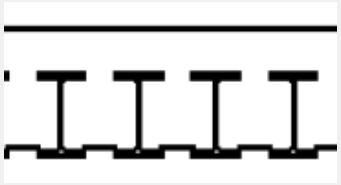


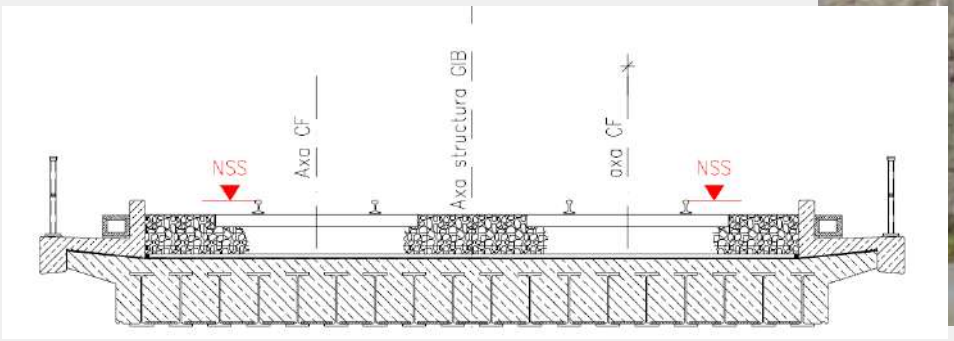


VFT-WIB®



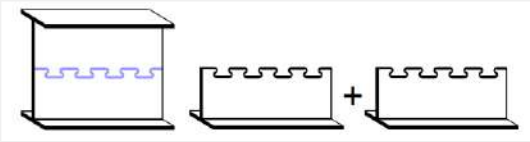
WIB →1980



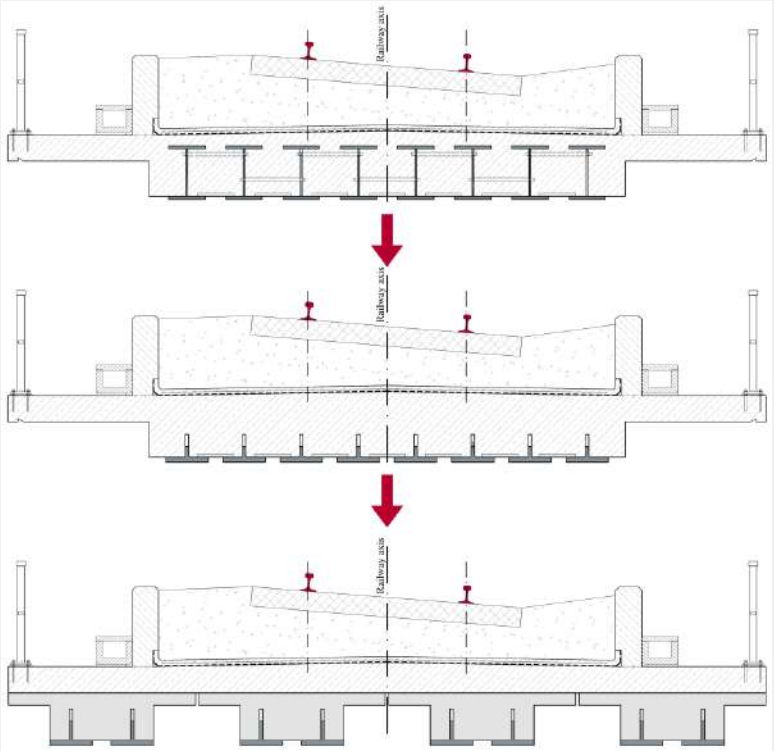


VFT-WIB®

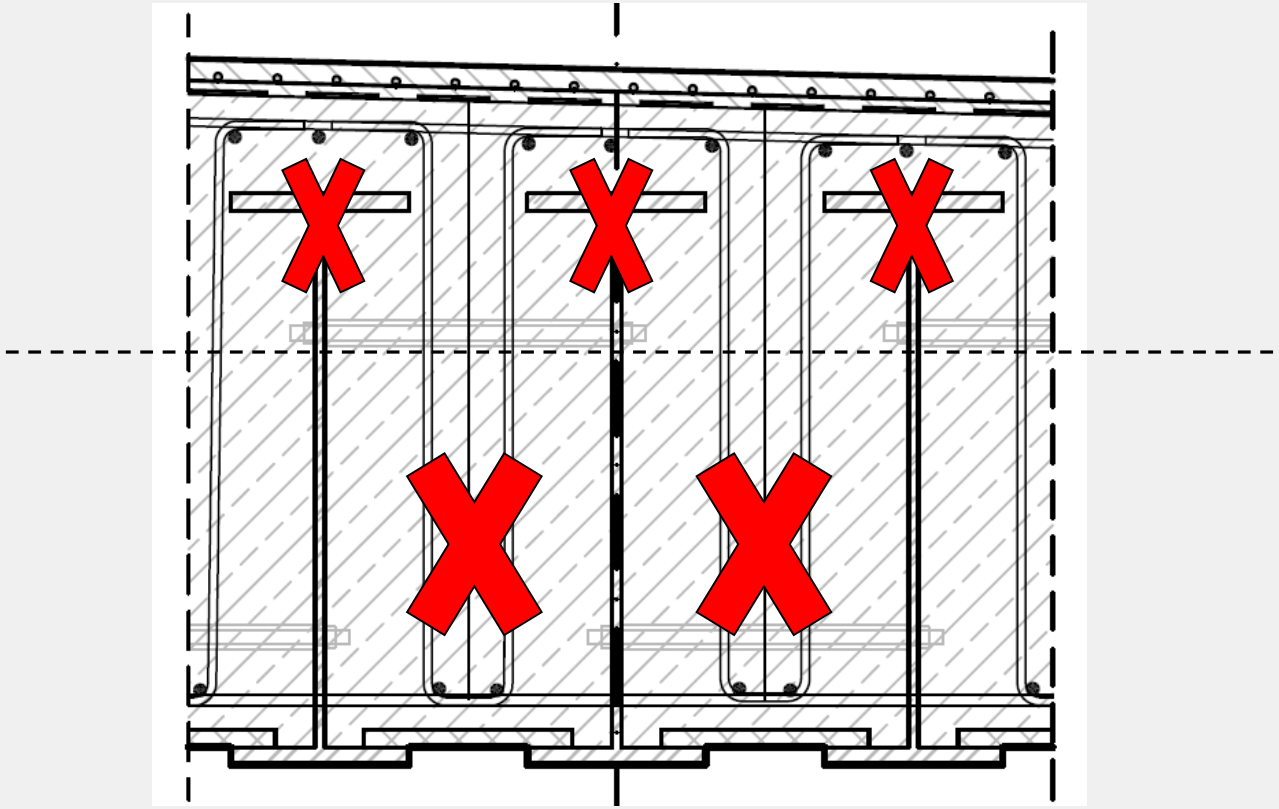
… and the new WIB – Decks generation



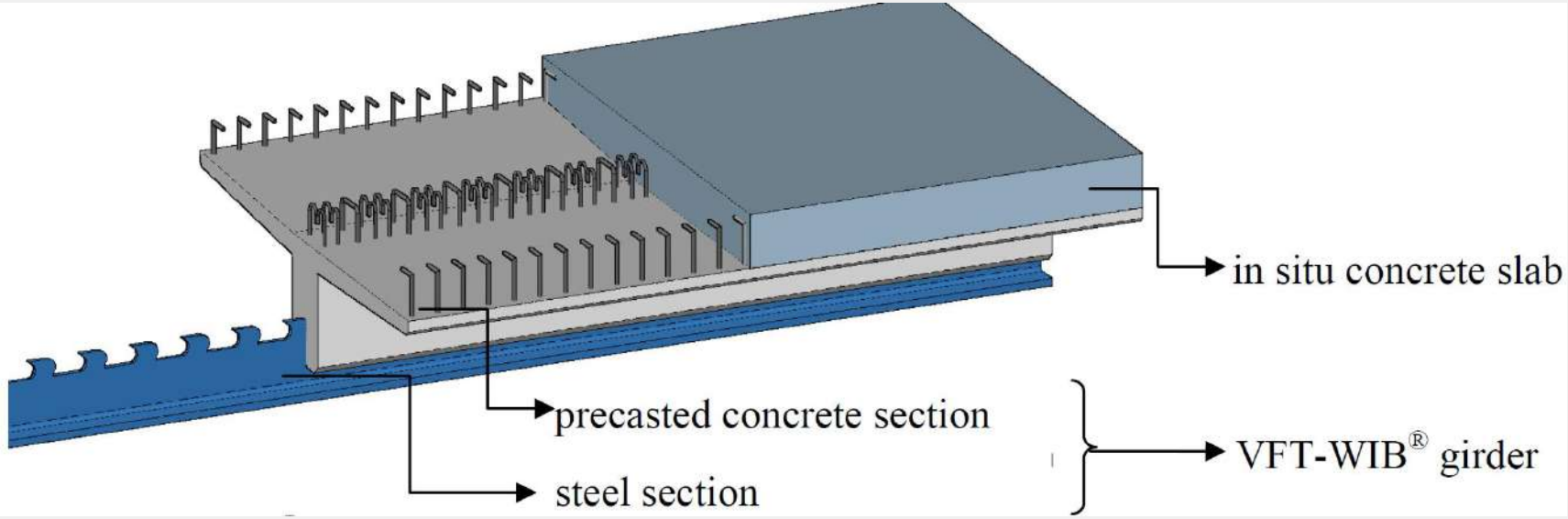
VFT-WIB



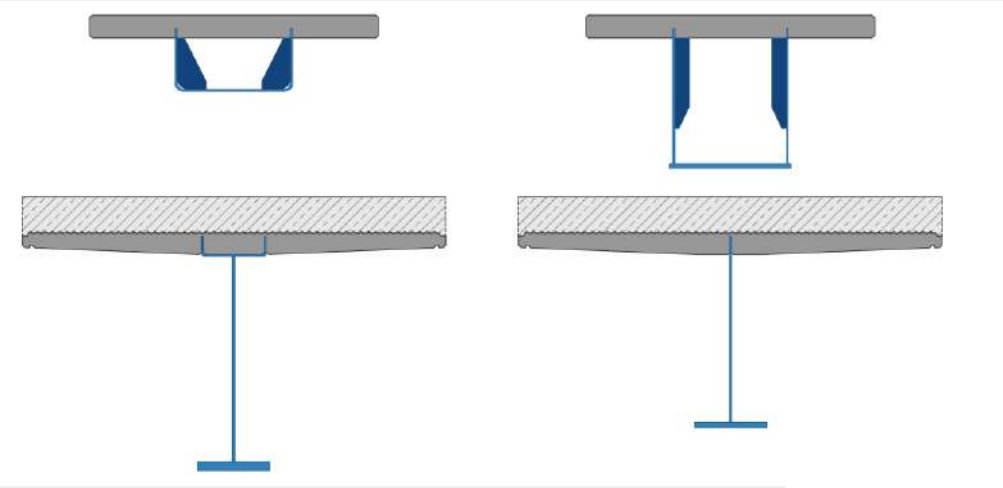
VFT-WIB®

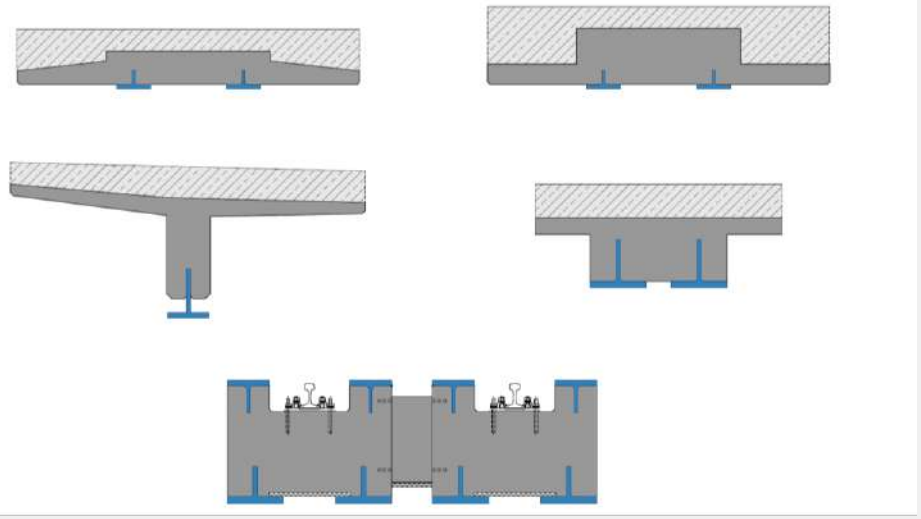


VFT-WIB®

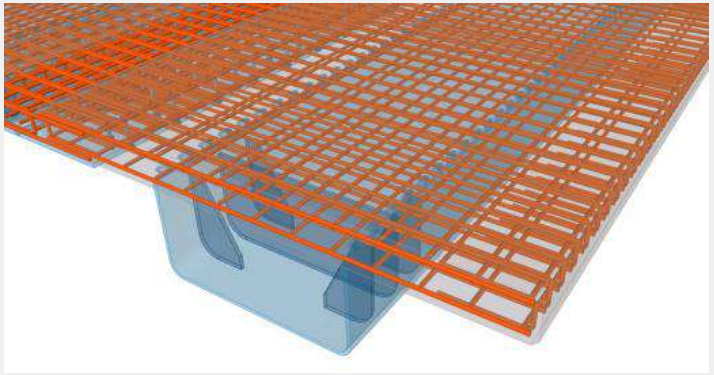

in situ concrete slab
precasted concrete section
steel section
VFT-WIB® girder

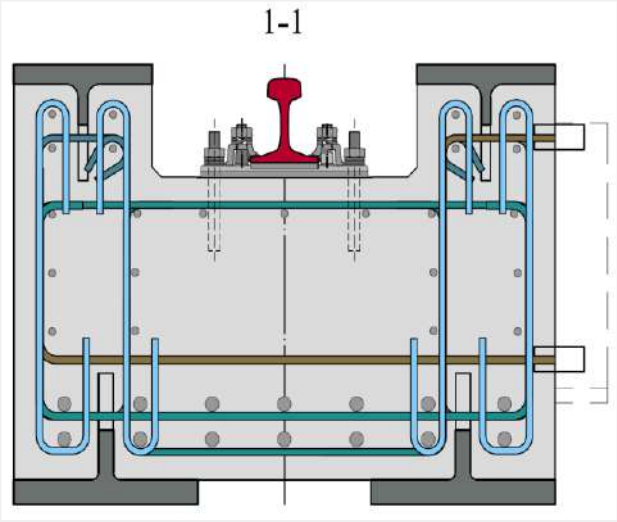
New construction method basing on innovative composite dowels. VFT-WIB® Method

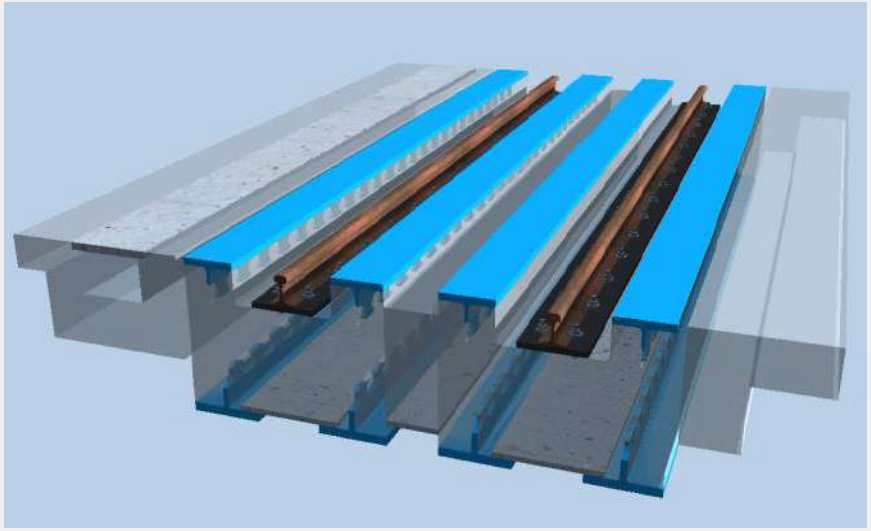




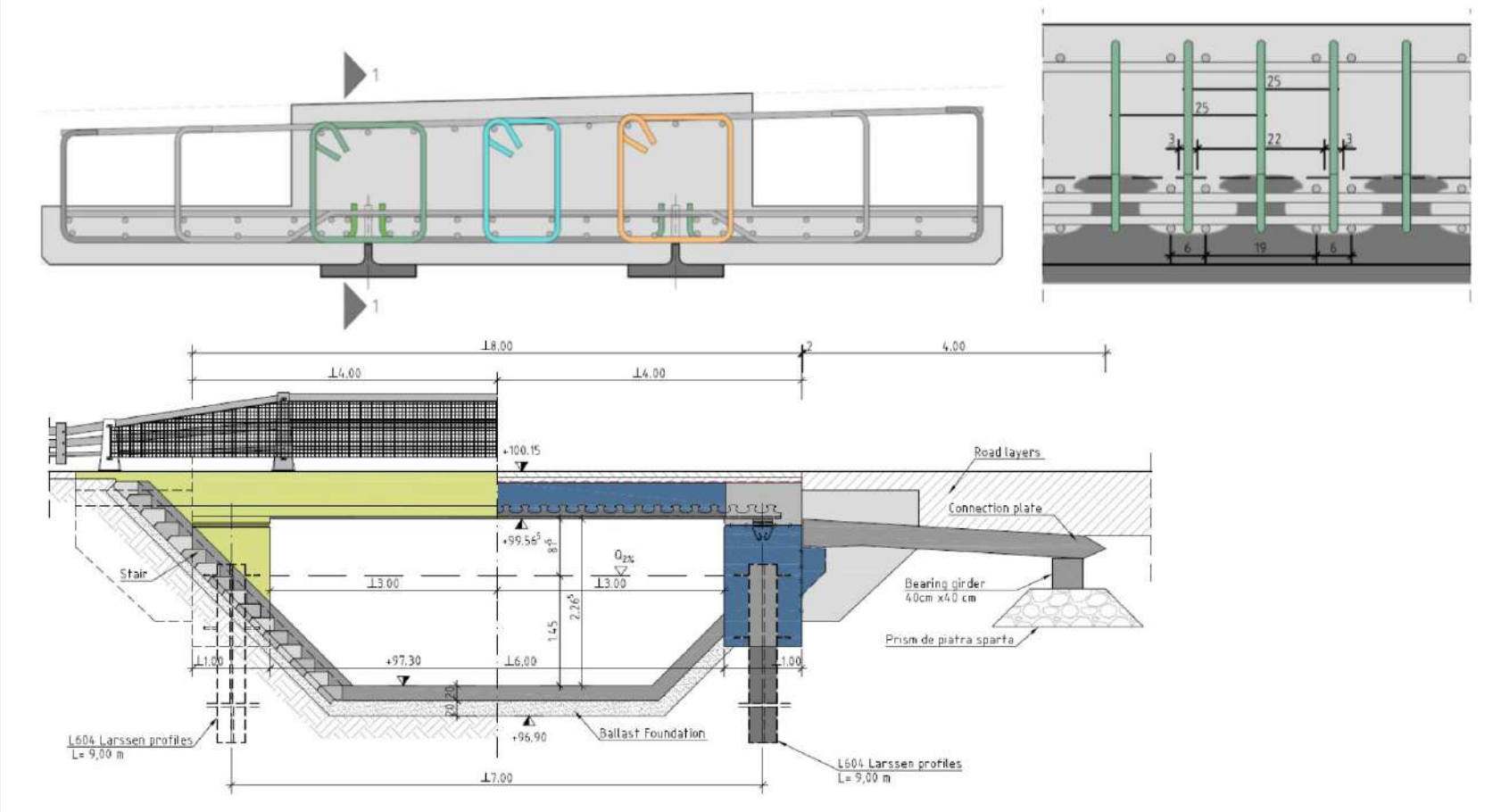
New construction method basing on innovative composite dowels. VFT-WIB® Method



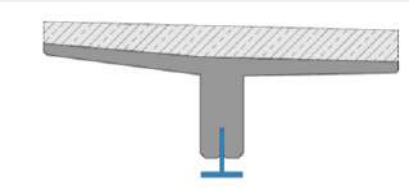


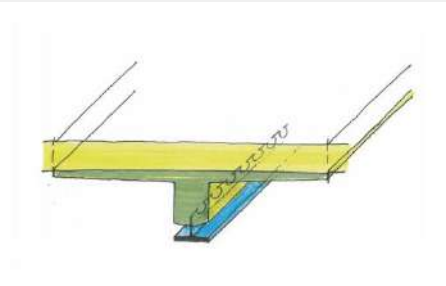


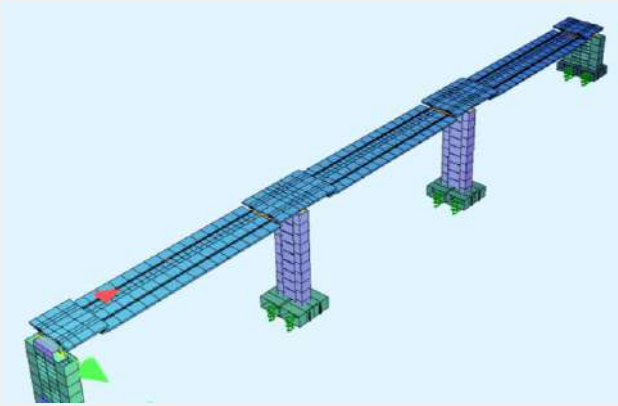
VFT-WIB® - Pod pe DN 79A km 60+627m

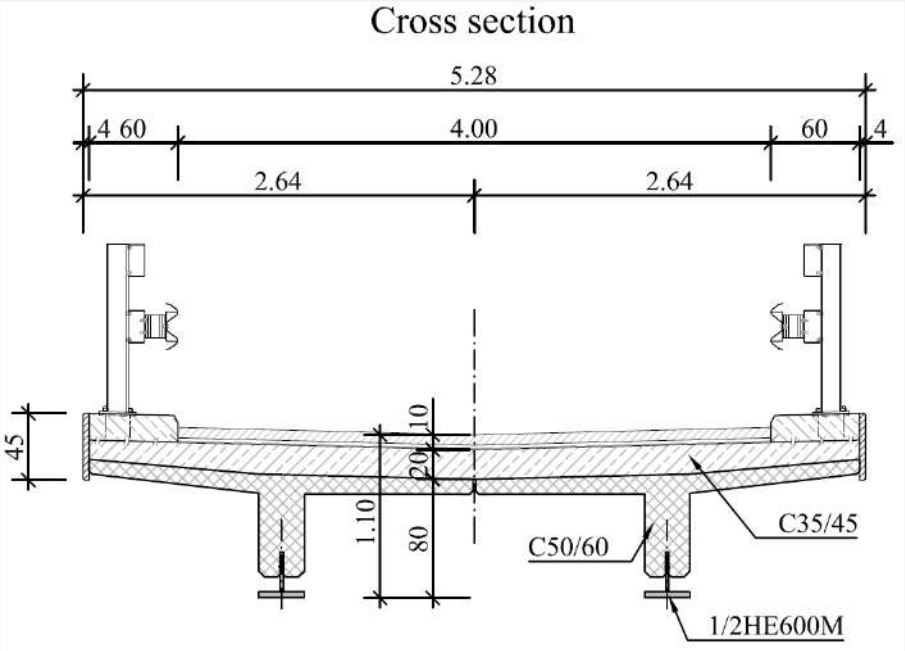


VFT-WIB®








Cross section
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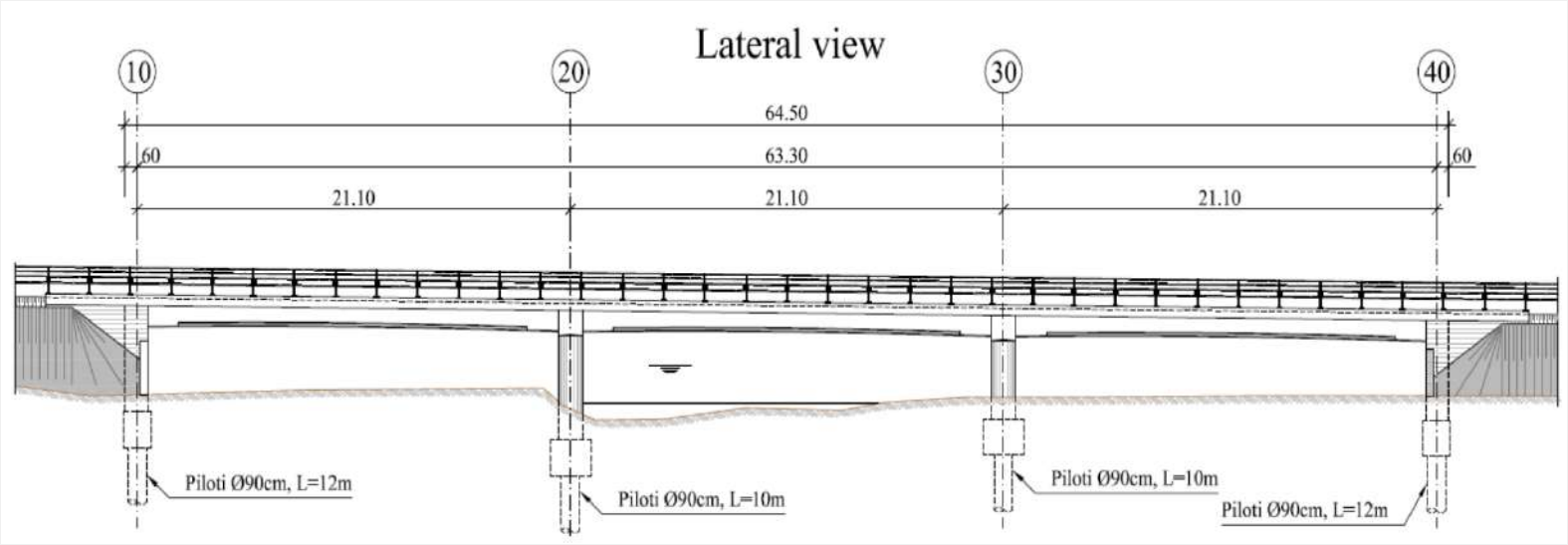
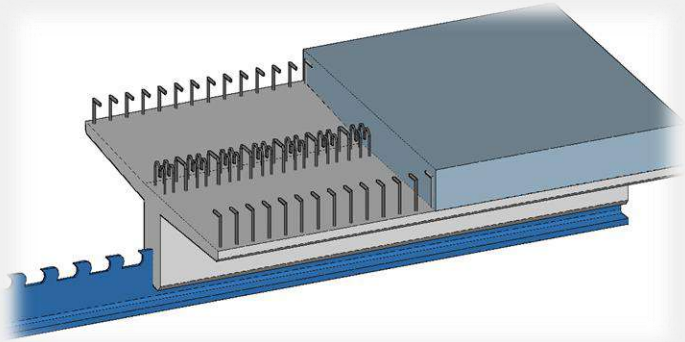
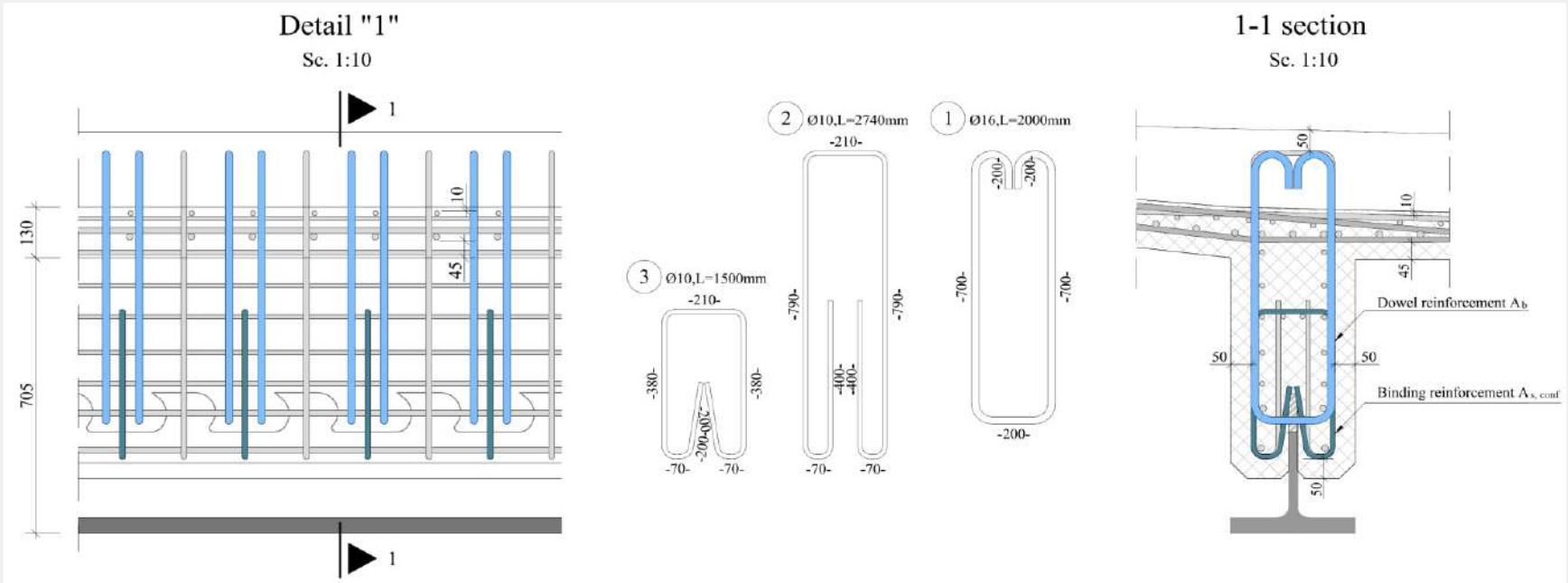
4 60
4.00
60
4
2.64
2.64
45
10
20
1.10
80
C50/60
C35/45
1/2HE600M

VFT-WIB® Frâncești Bridge





VFT-WIB®



Designed

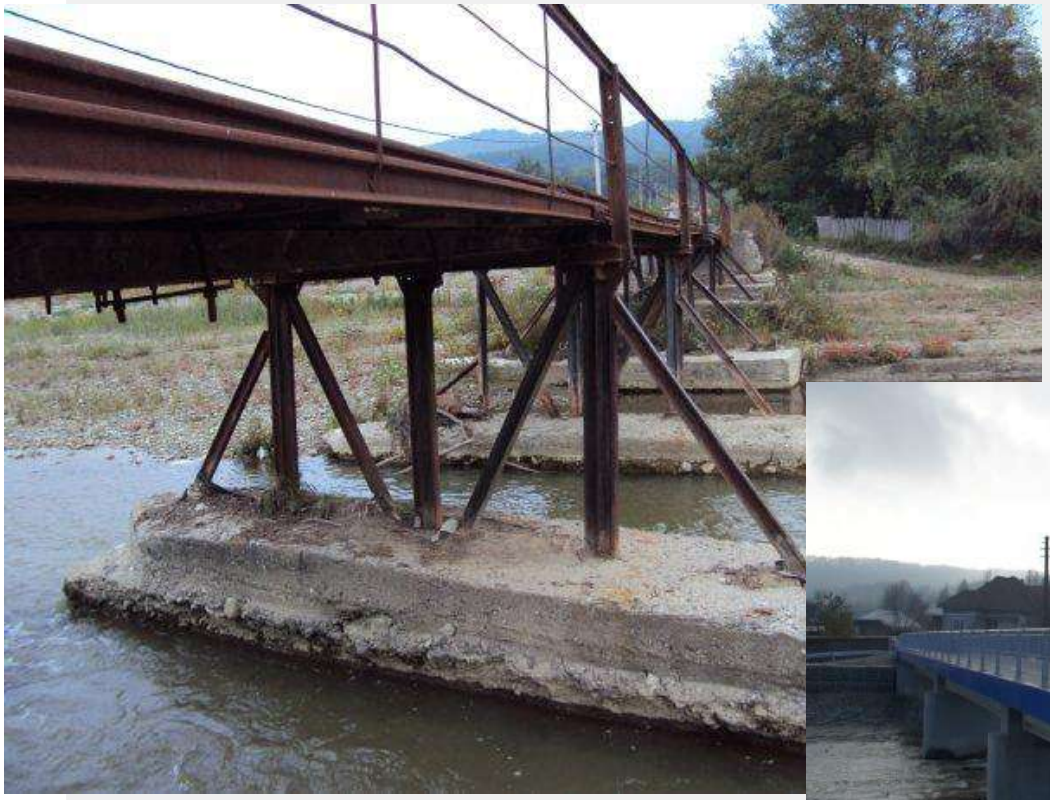
VFT-WIB®

Executet

VFT-WIB® Method

VFT-WIB® Method

VFT-WIB® - Podul Frâncești



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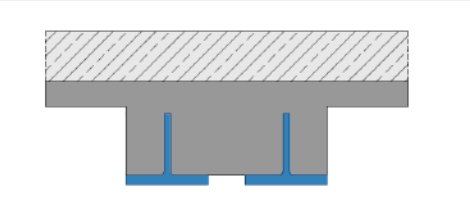

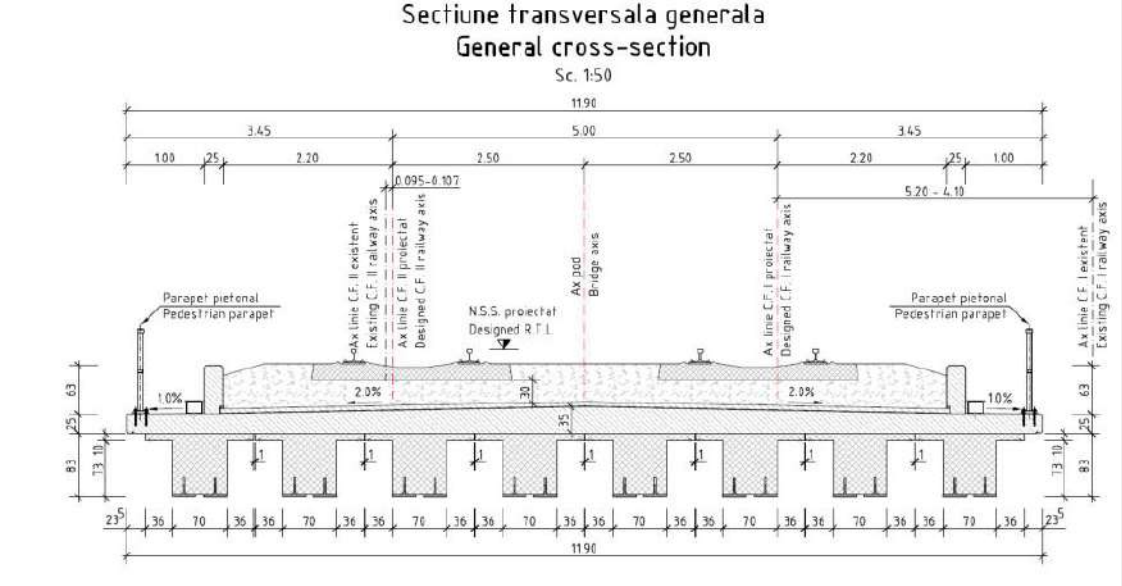
Sectiune transversala generala
General cross-section
Sc. 1:50
11.90
3.45
5.00
3.45
1.00
.25
2.20
2.50
2.50
2.20
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1.00
0.095-0.107
5.20 - 4.10
Parapet pietonal
Pedestrian parapet
Ax linie C.F. II existent
Existing C.F. II railway axis
Ax linie C.F. II proiectat
Designed C.F. II railway axis
N.S.S. proiectat
Designed R.T.L.
Ax pod
Bridge axis
Ax linie C.F. I proiectat
Designed C.F. I railway axis
Parapet pietonal
Pedestrian parapet
Ax linie C.F. I existent
Existing C.F. I railway axis
1.0%
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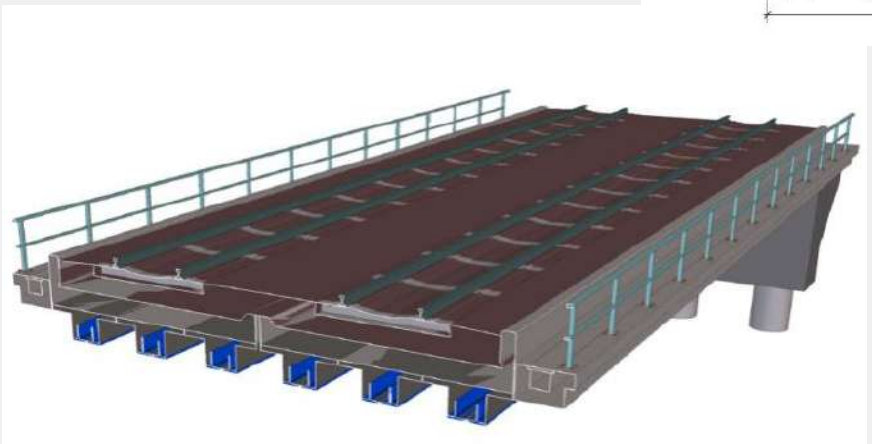
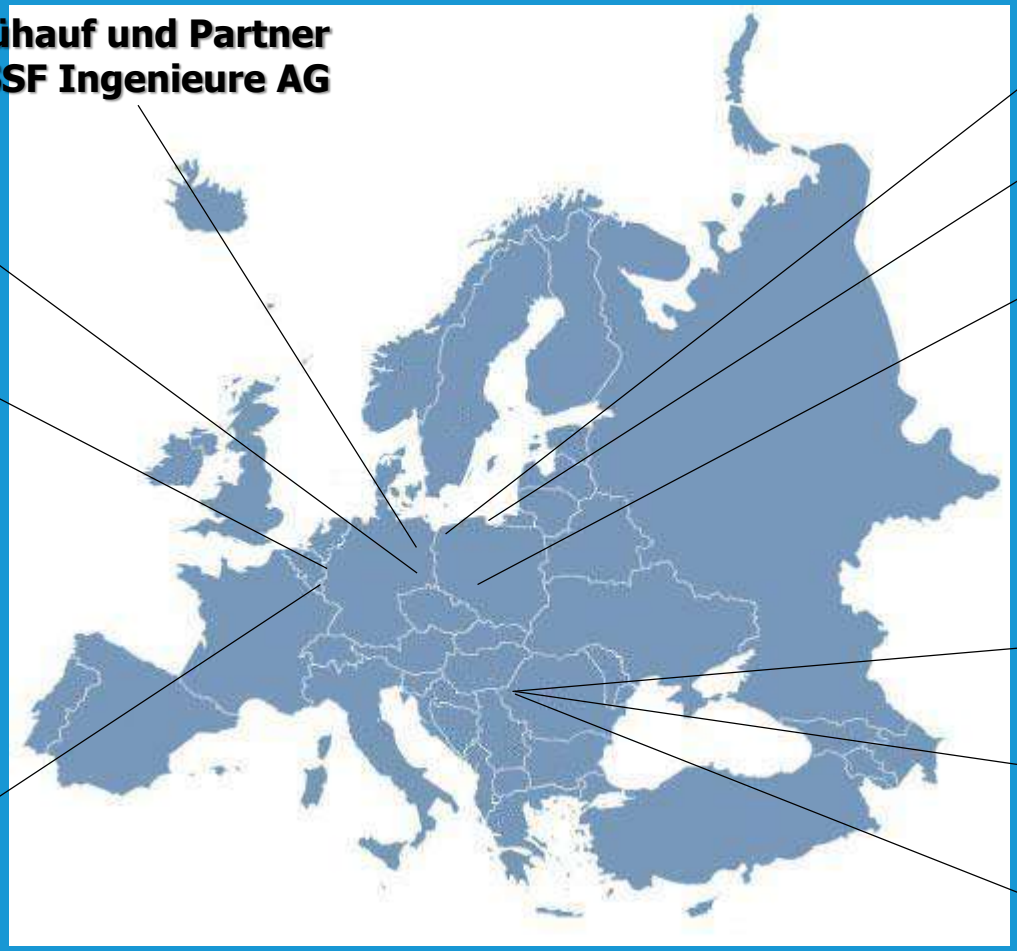


New construction method basing on innovative composite dowels. VFT-WIB® Method

VFT-WIB® Method

Project Partners



Schmitt Stumpf Frühauf und Partner
SSF Ingenieure AG

TWT

Rheinisch Westfälische Technische Hochschule

ArcelorMittal

Energopol

Europrojekt

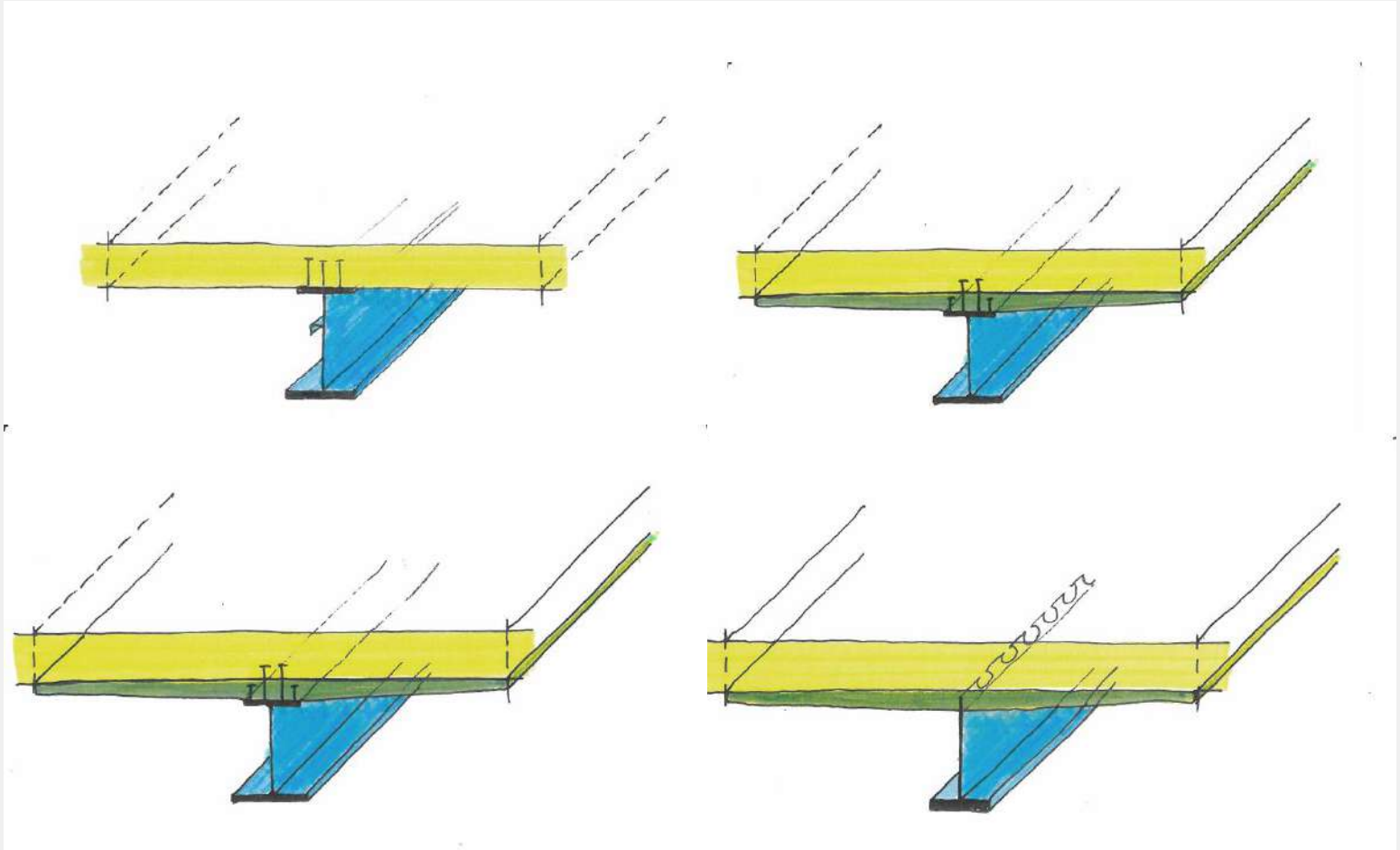
Wrocław University of Technology

Universitatea Politehnica Timişoara

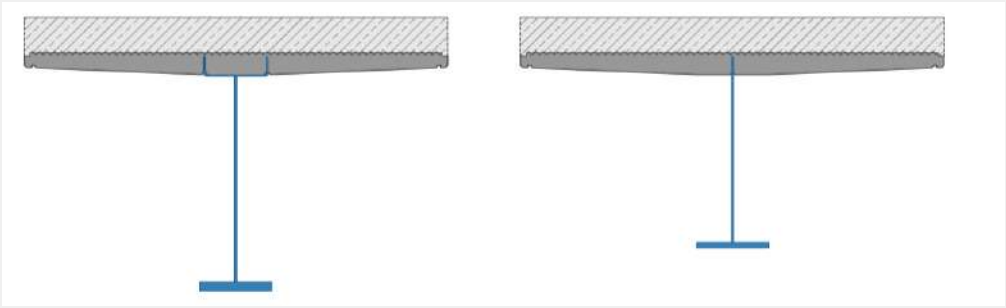
SSF-RO Ltd

Directia Regionala de Drumuri si Poduri

New efficient solutions for bridges

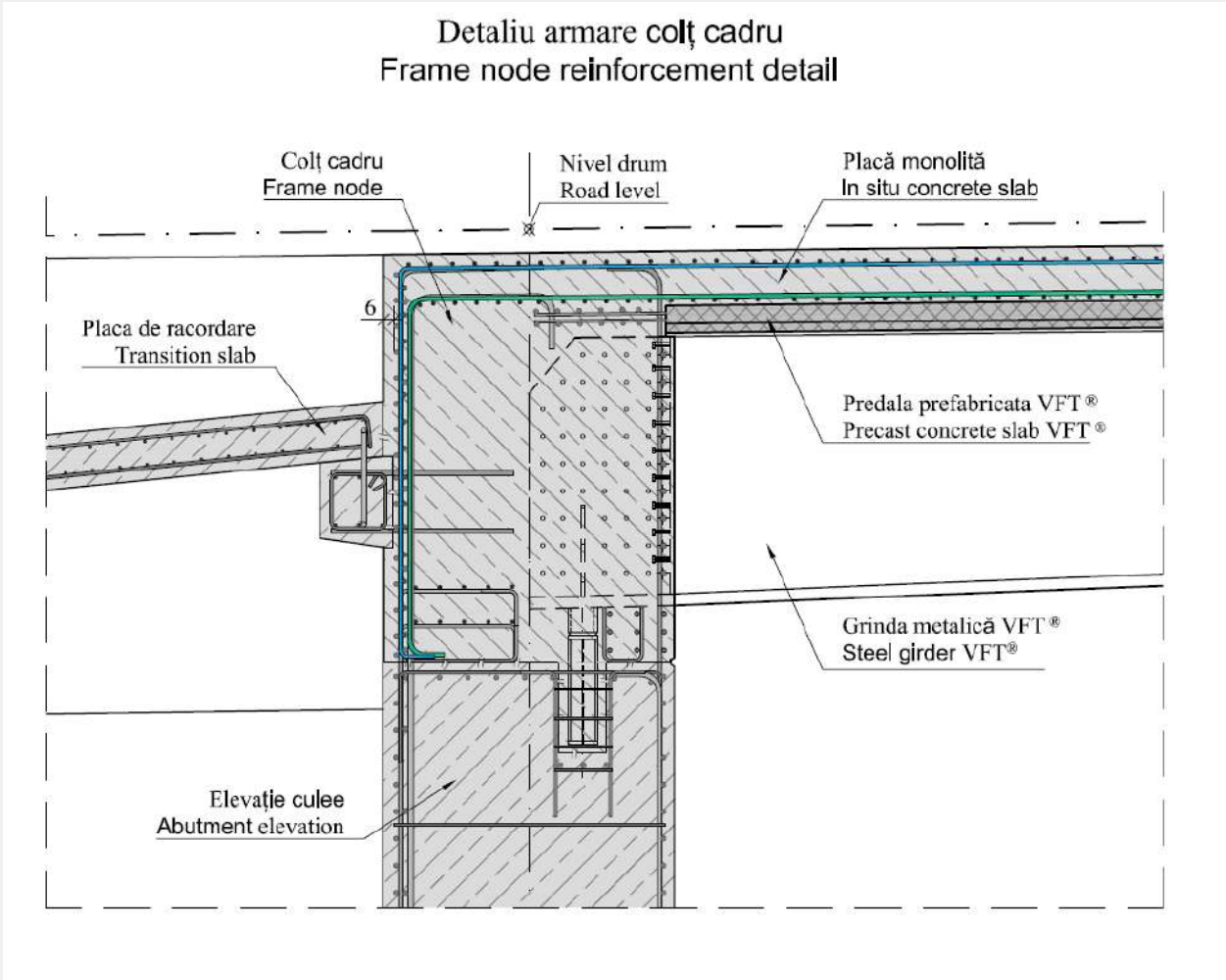


New construction method basing on innovative composite dowels. VFT-WIB® Method

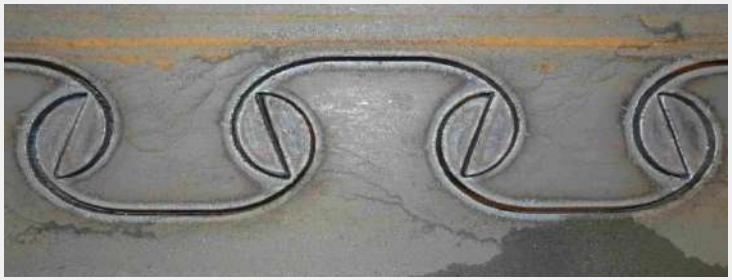


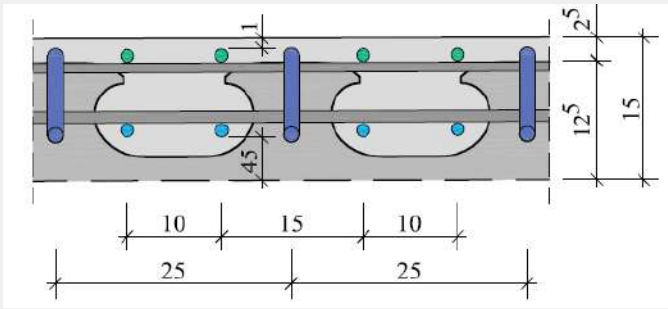
New efficient solutions for bridges

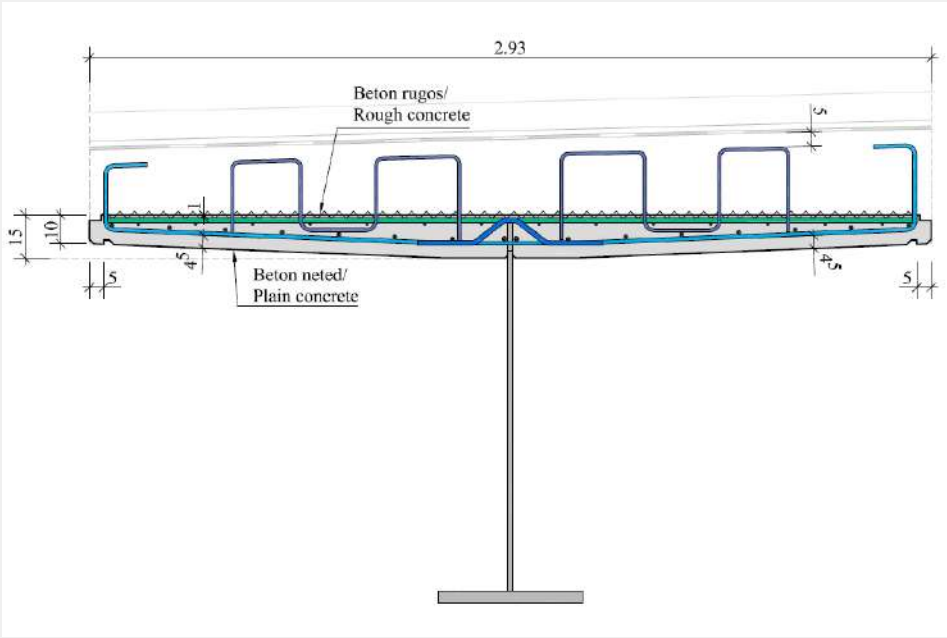
New efficient solutions for bridges



New efficient solutions for bridges





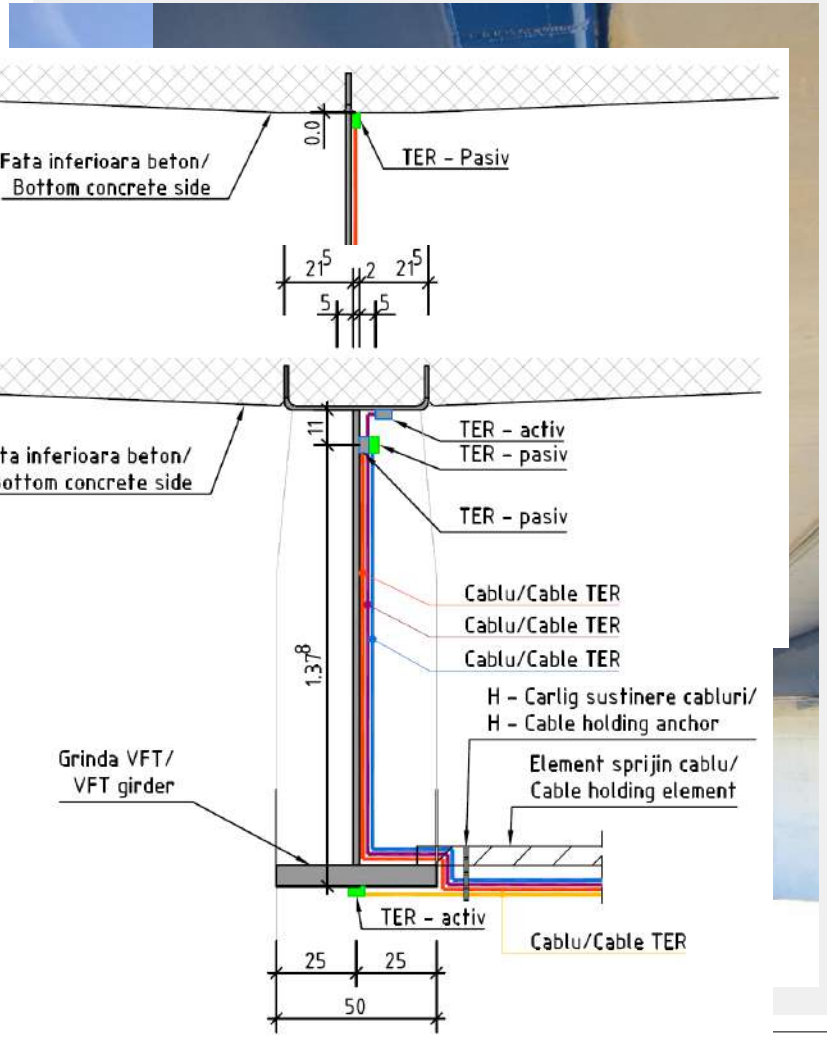


New efficient solutions for bridges

SSF-RO RETTER group

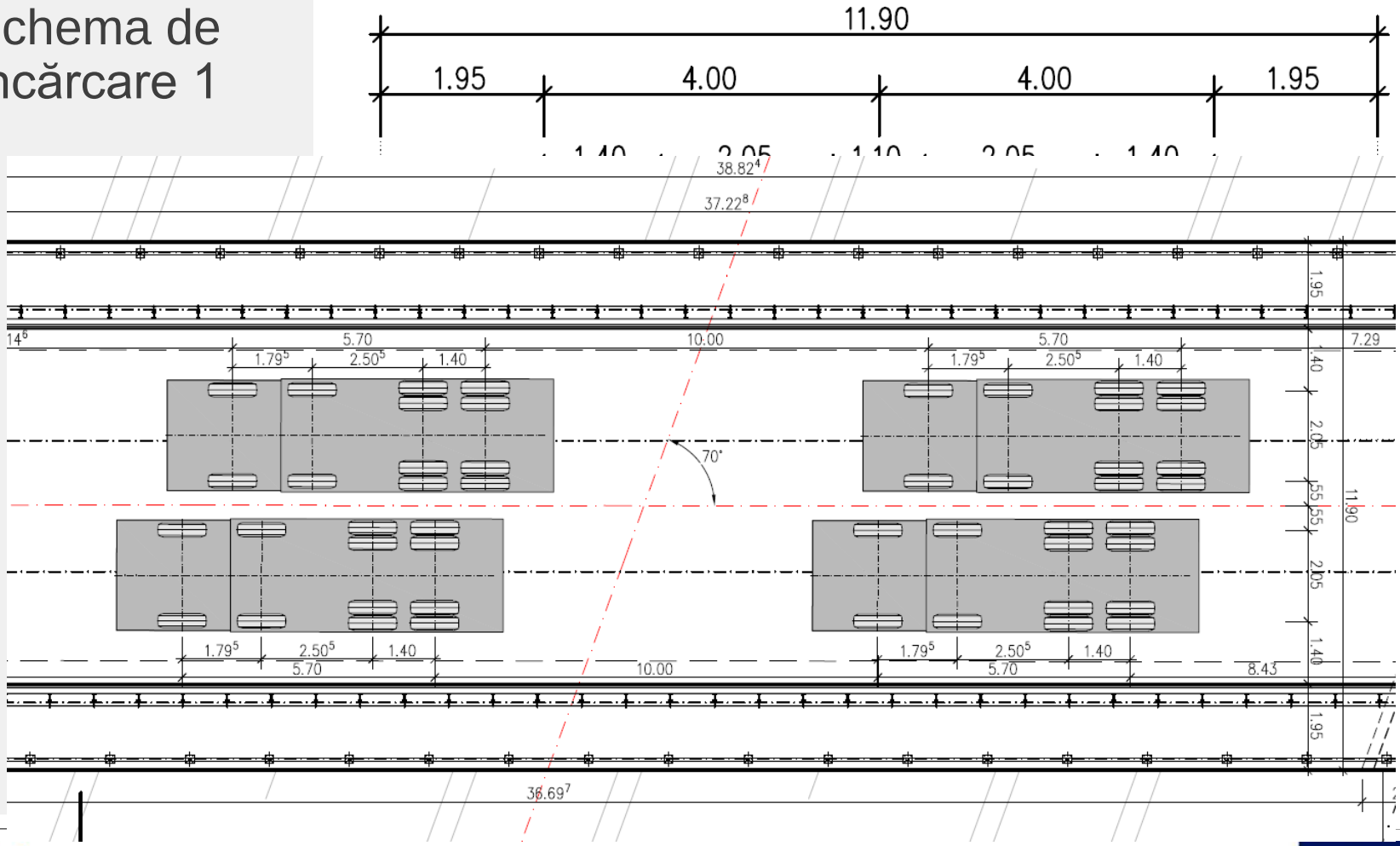
UPT Universitatea Politehnica Timişoara

New efficient solutions for bridges

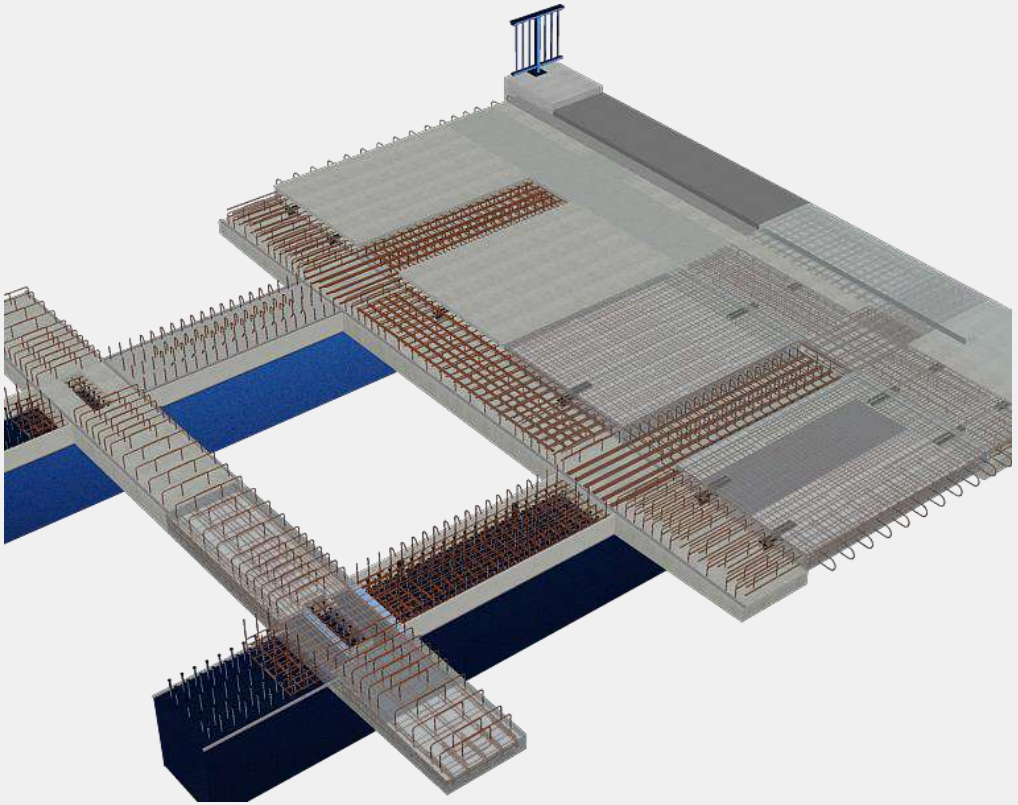


New efficient solutions for bridges

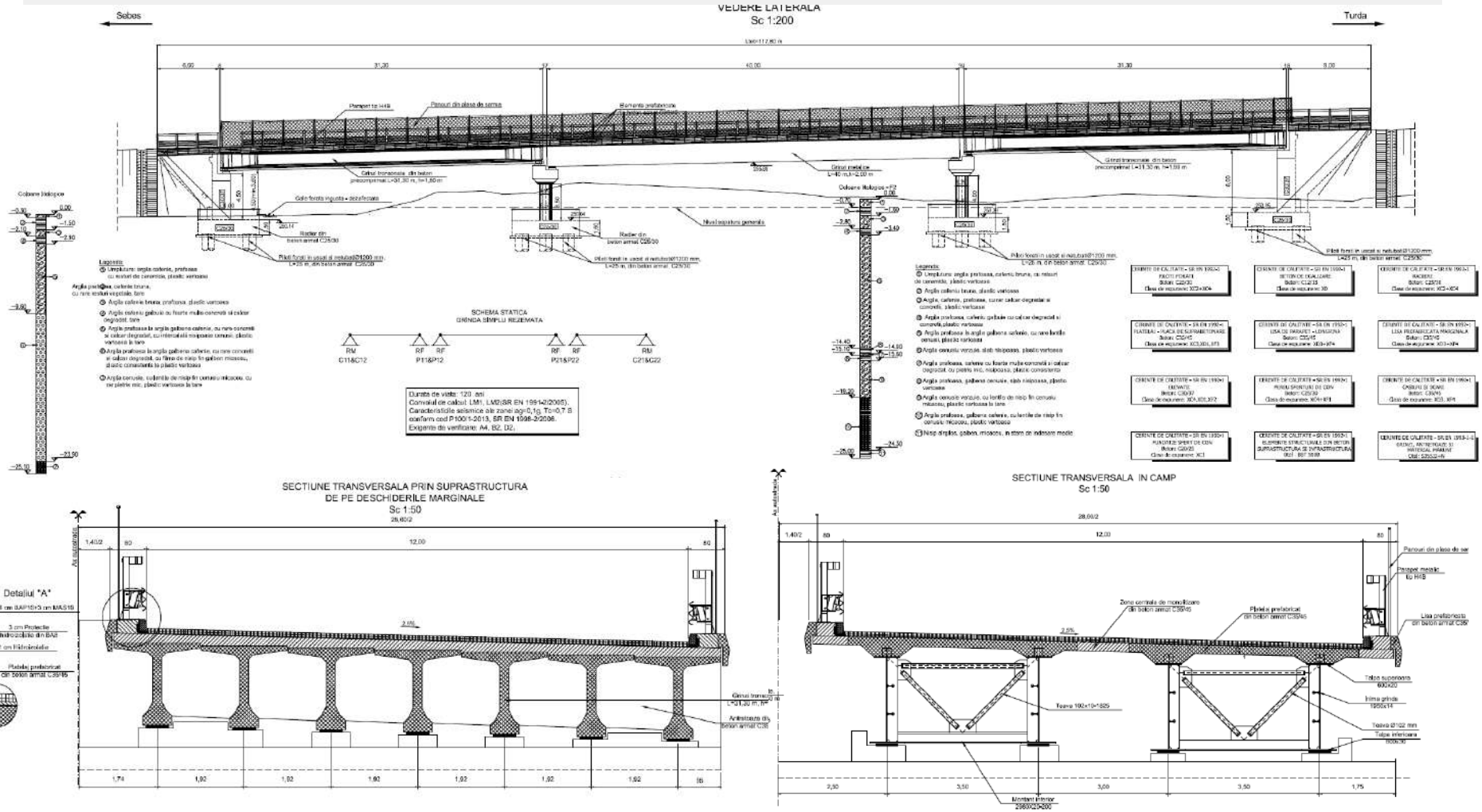
Schema de încărcare 1



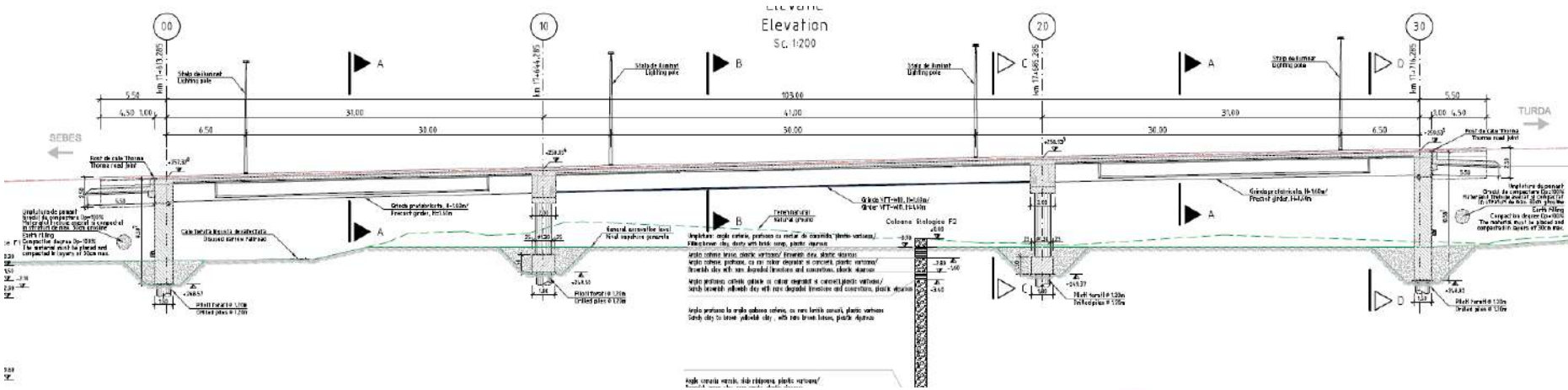
Sebeş – Turda Lot 2

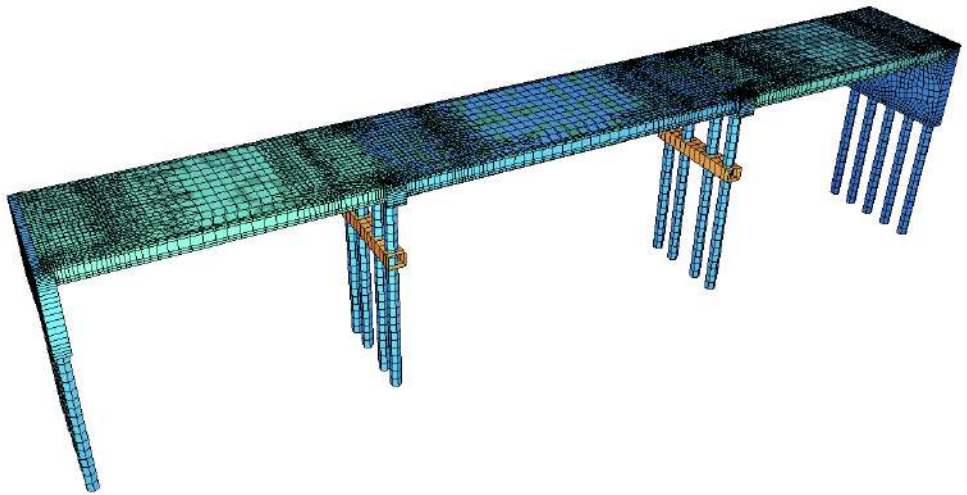


New construction method VFT-WIB®
Example for bridge at km 17+600; A3 Motorway

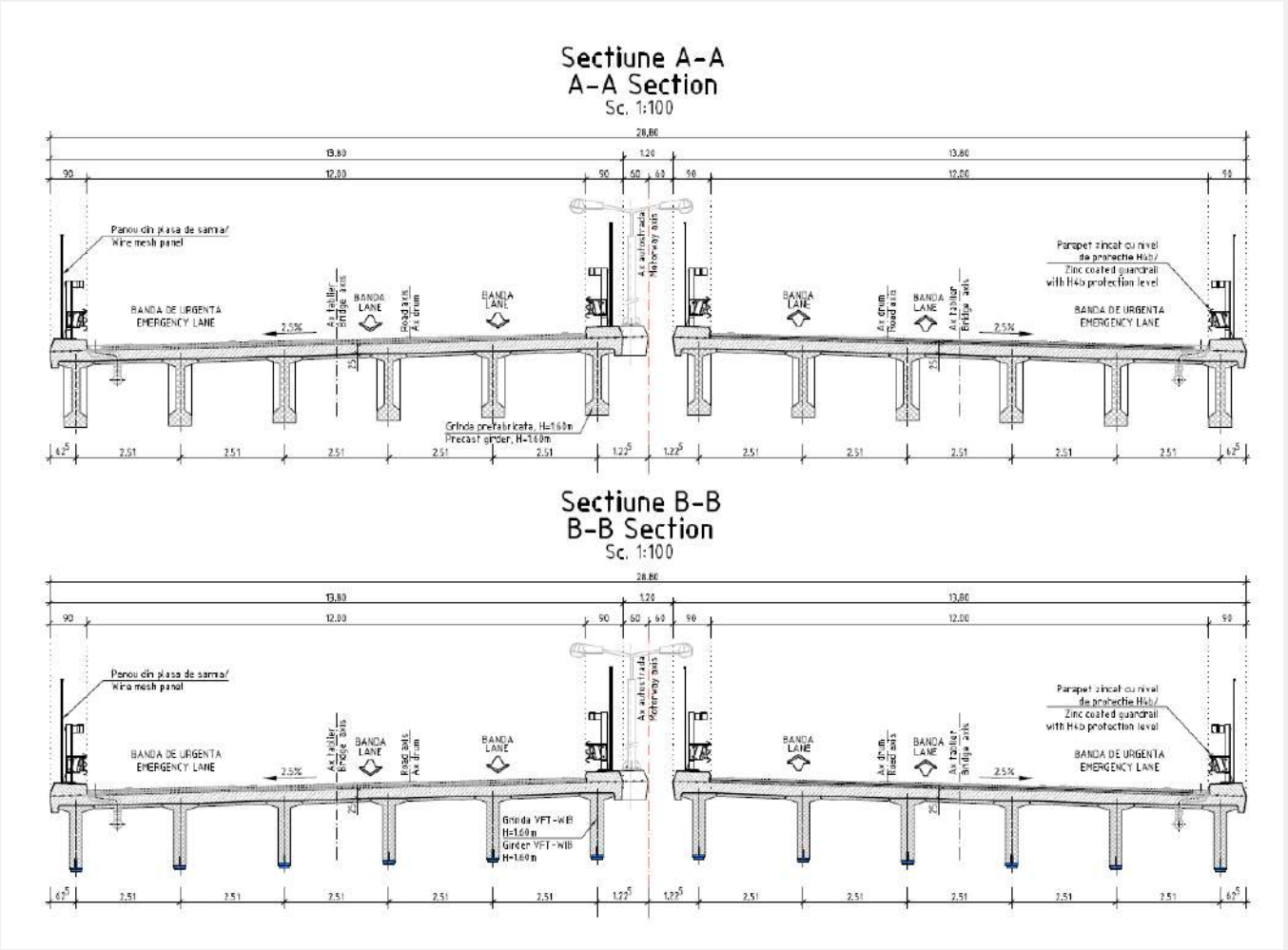


New construction method VFT-WIB®
Example for bridge at km 17+600; A3 Motorway

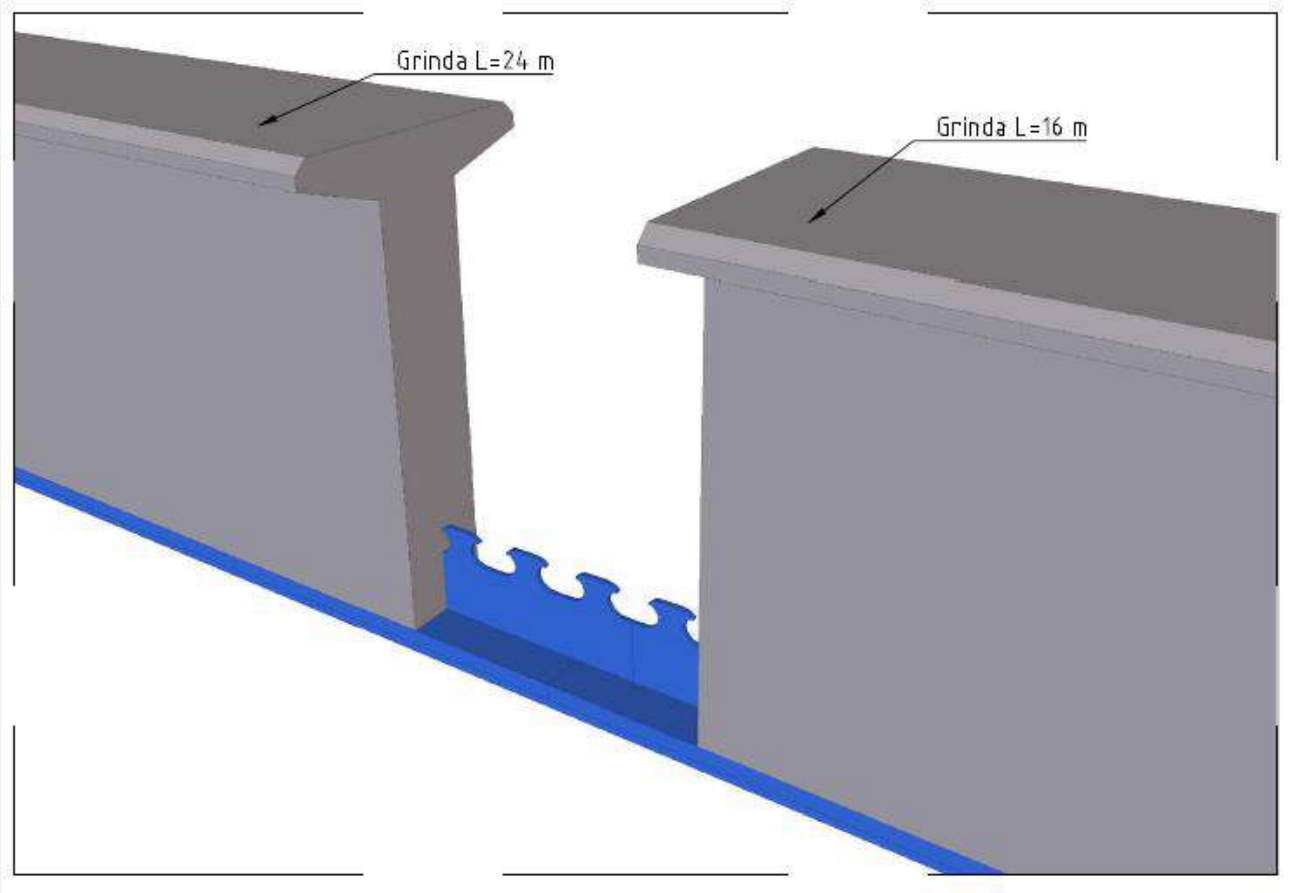




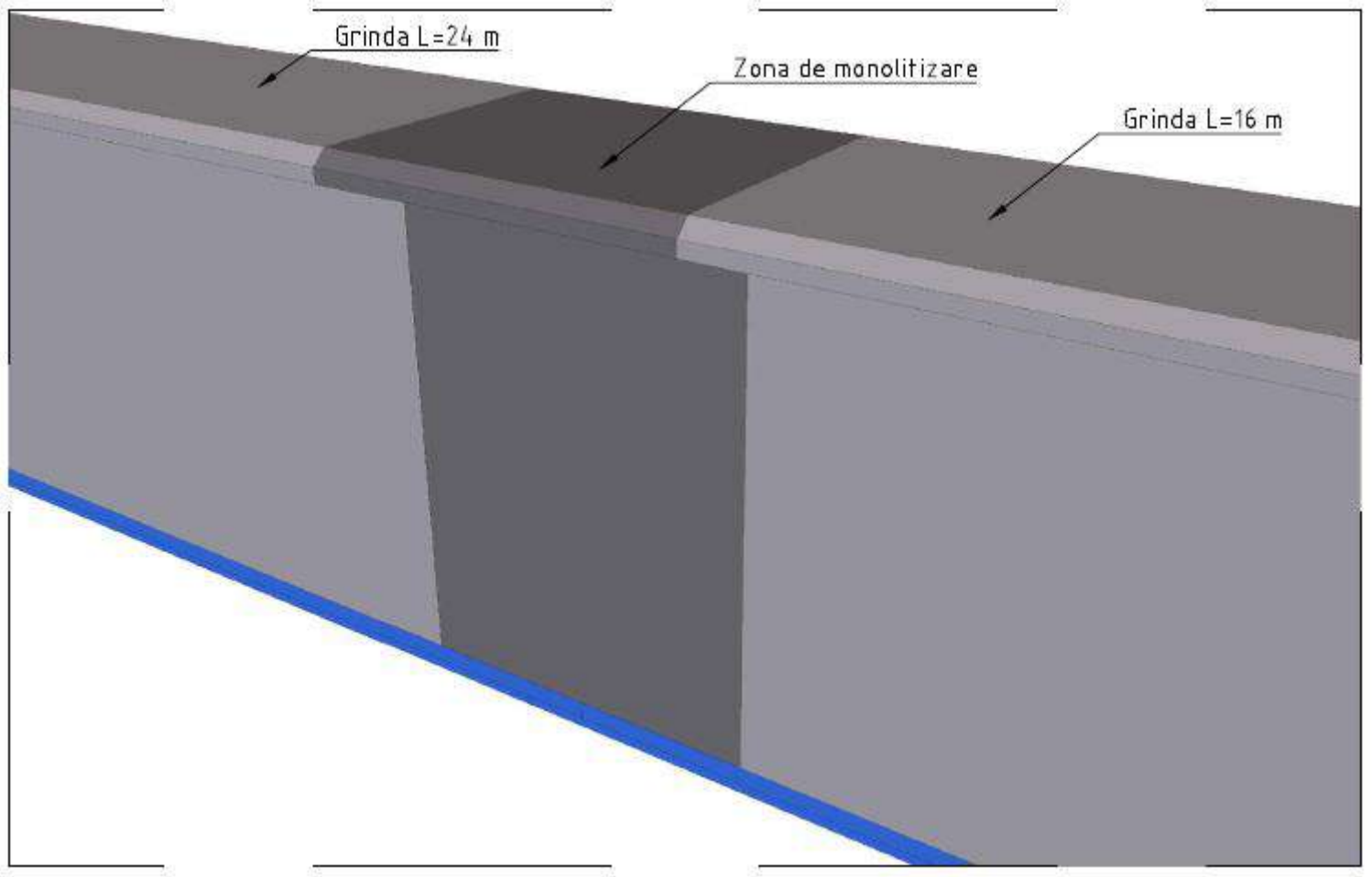
New construction method VFT-WIB®
Example for bridge at km 17+600; A3 Motorway



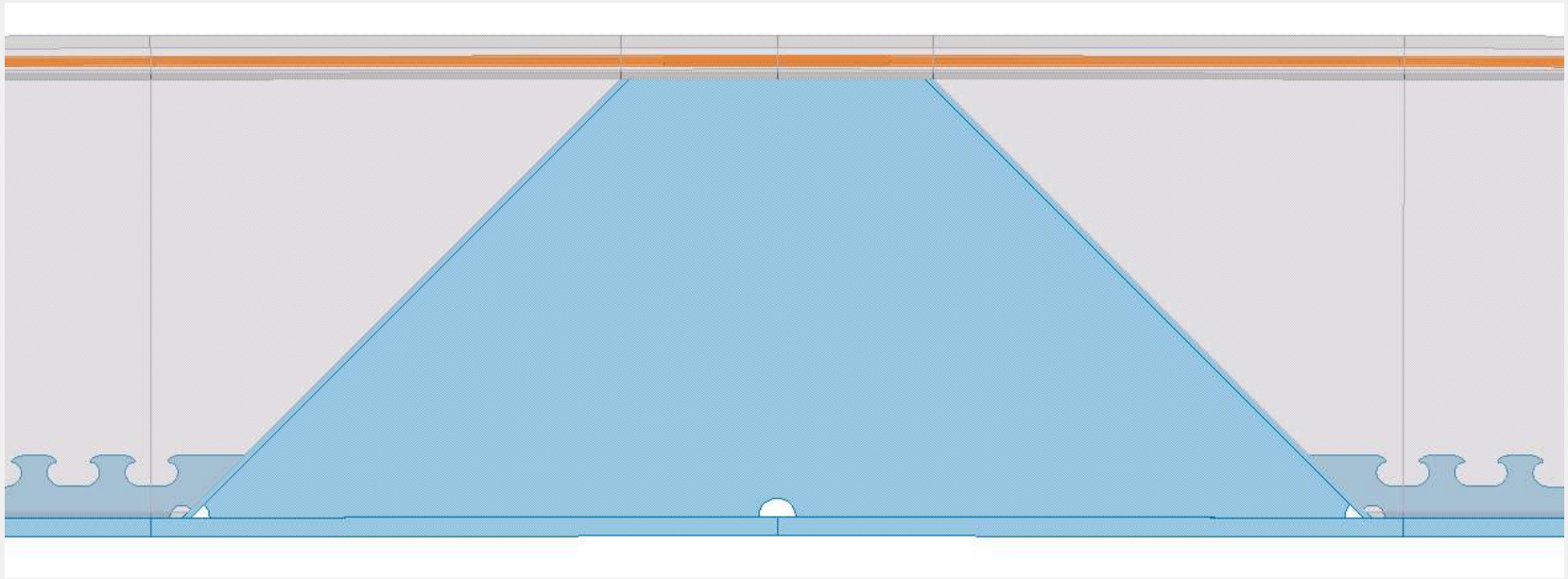
New construction method VFT-WIB®
Bridge beams for 41 m span



New construction method VFT-WIB®
Bridge beams for 41 m span



New construction method VFT-WIB®
Bridge beams for 41 m span



New construction method VFT-WIB®
Bridge beams for 41 m span

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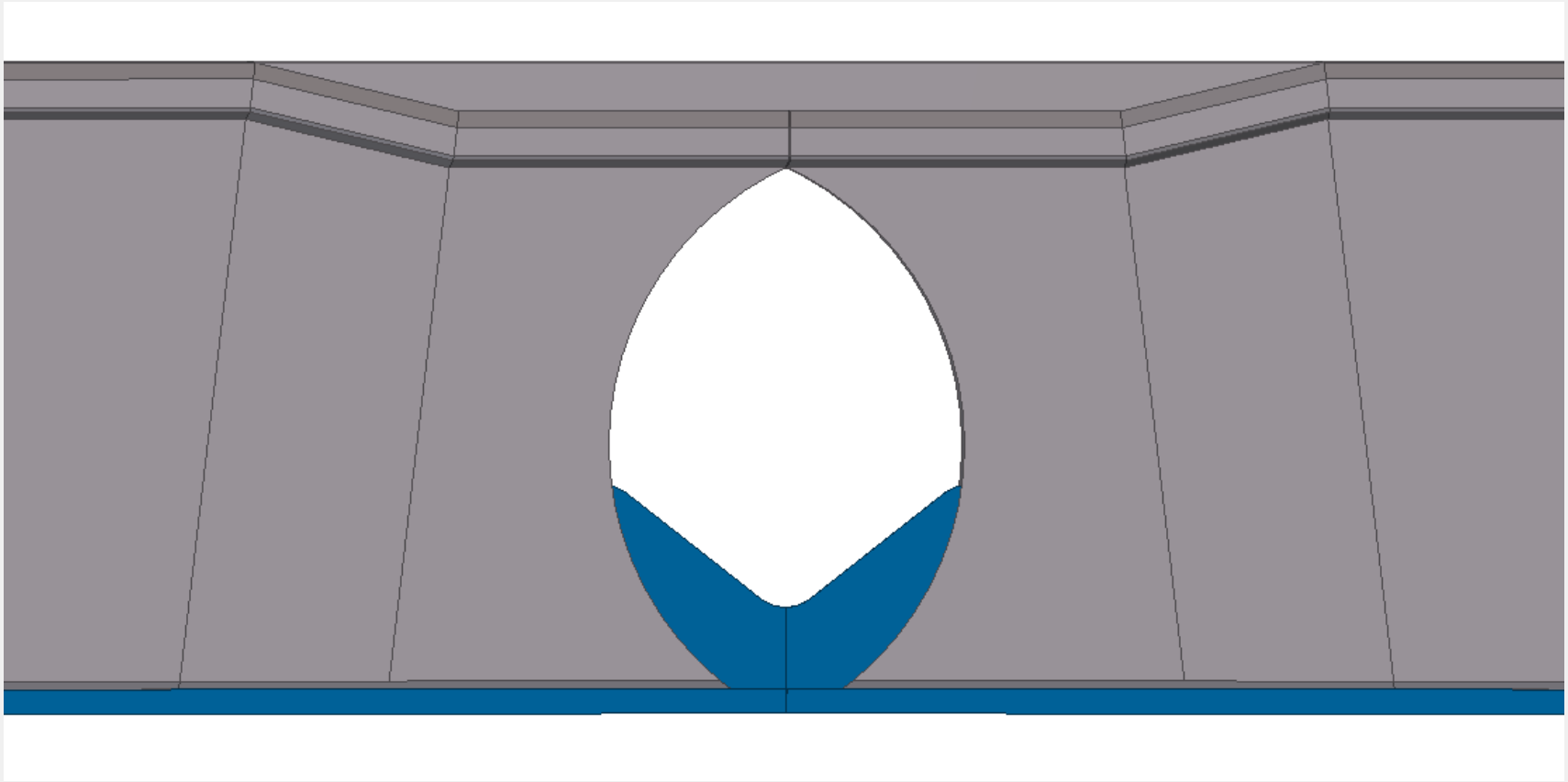
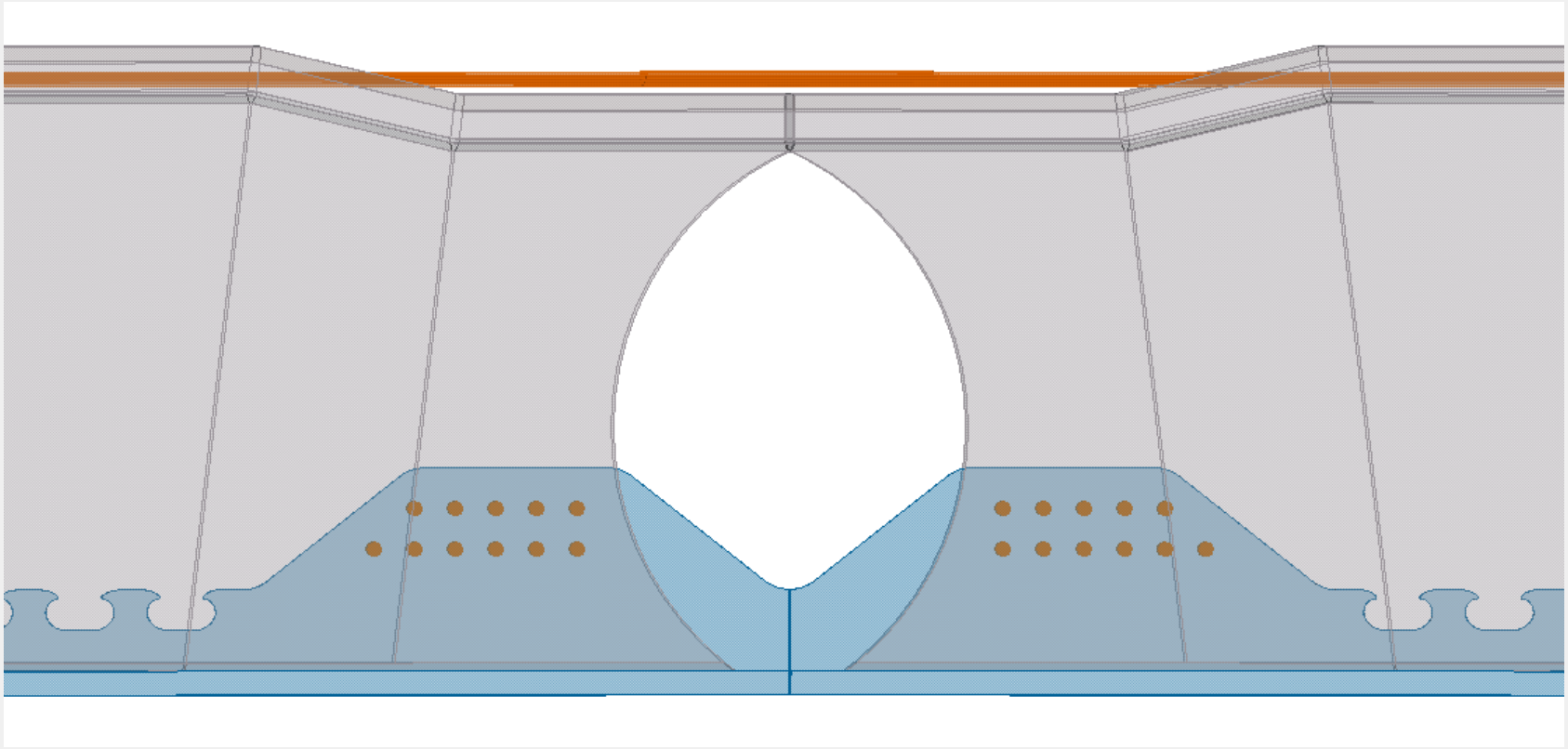


New construction method VFT-WIB®
Bridge beams for 41 m span



New construction method VFT-WIB®
Bridge beams for 41 m span

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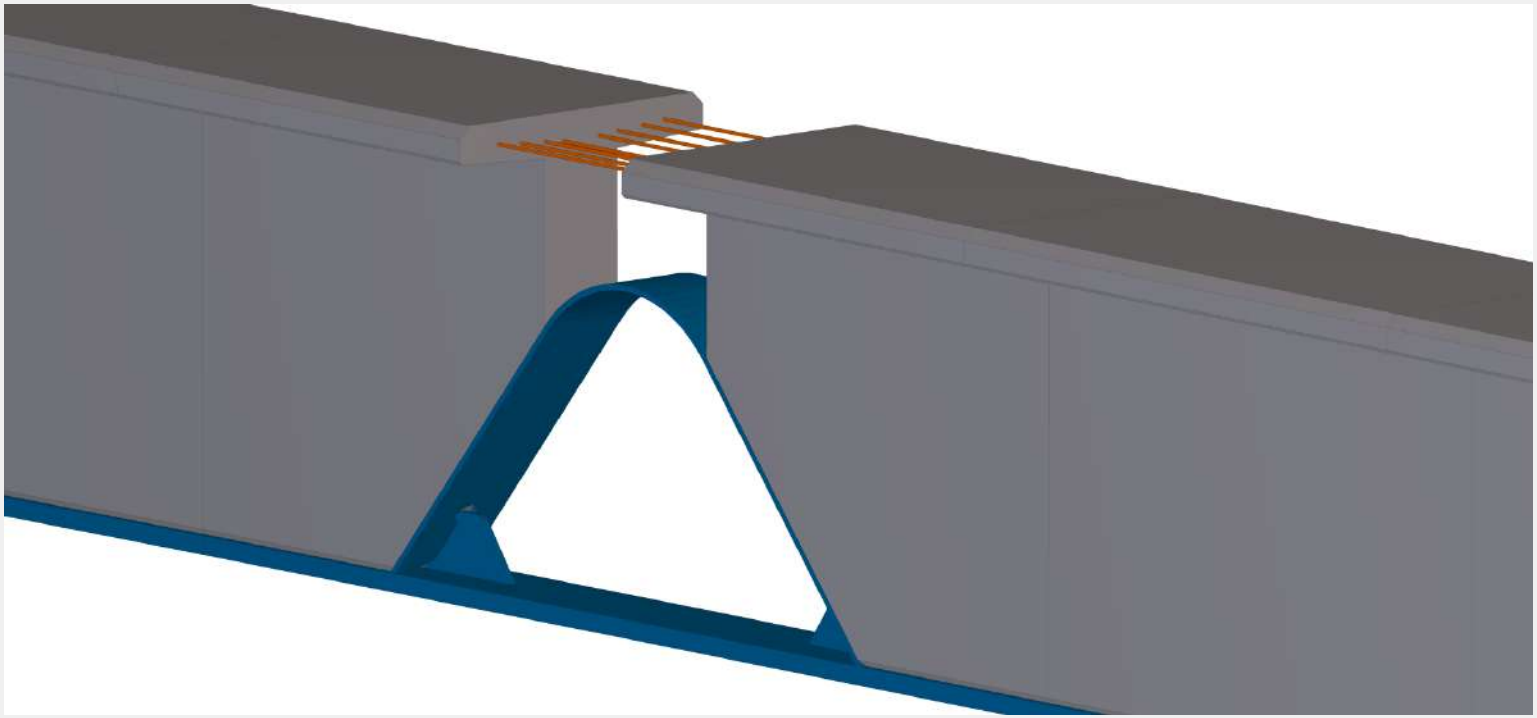
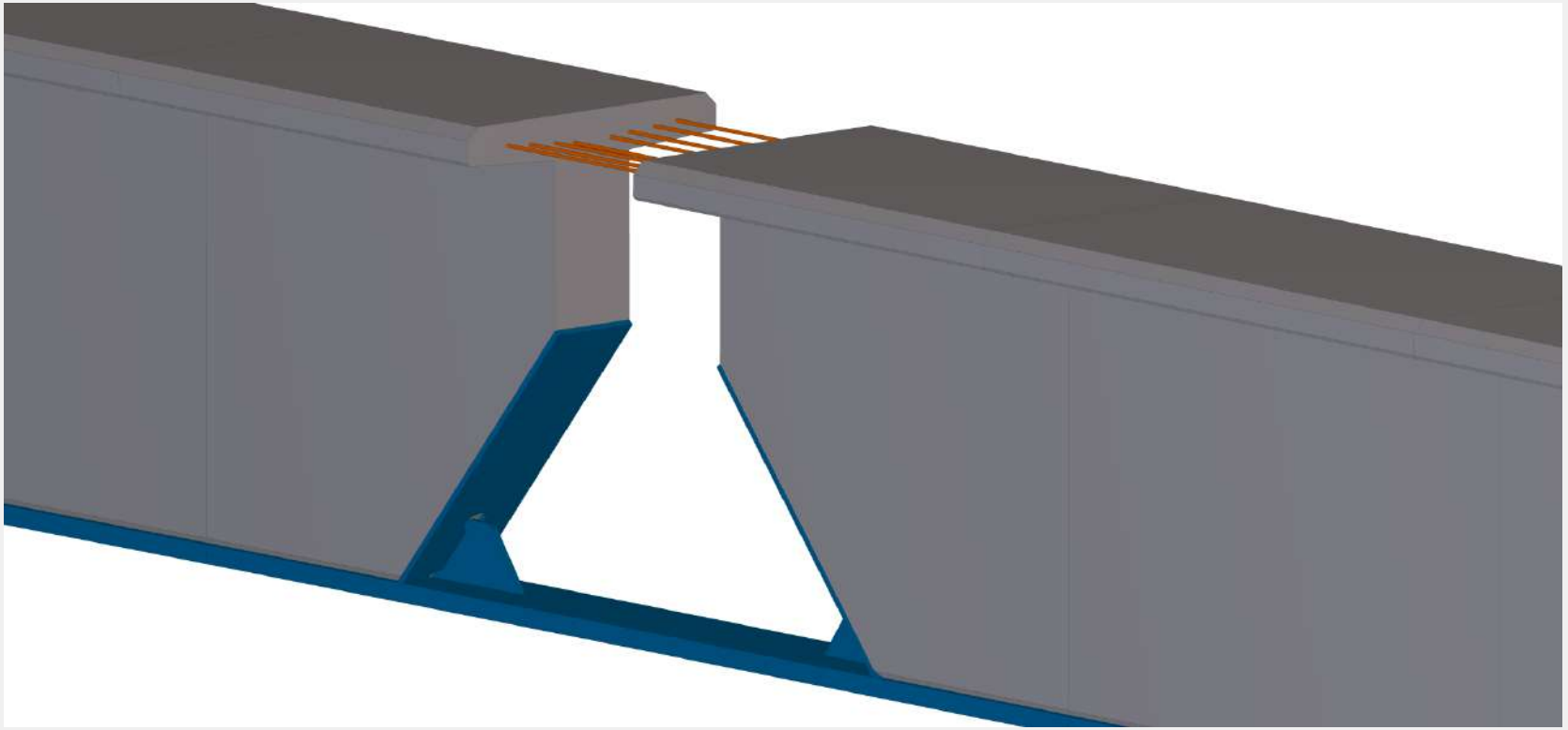
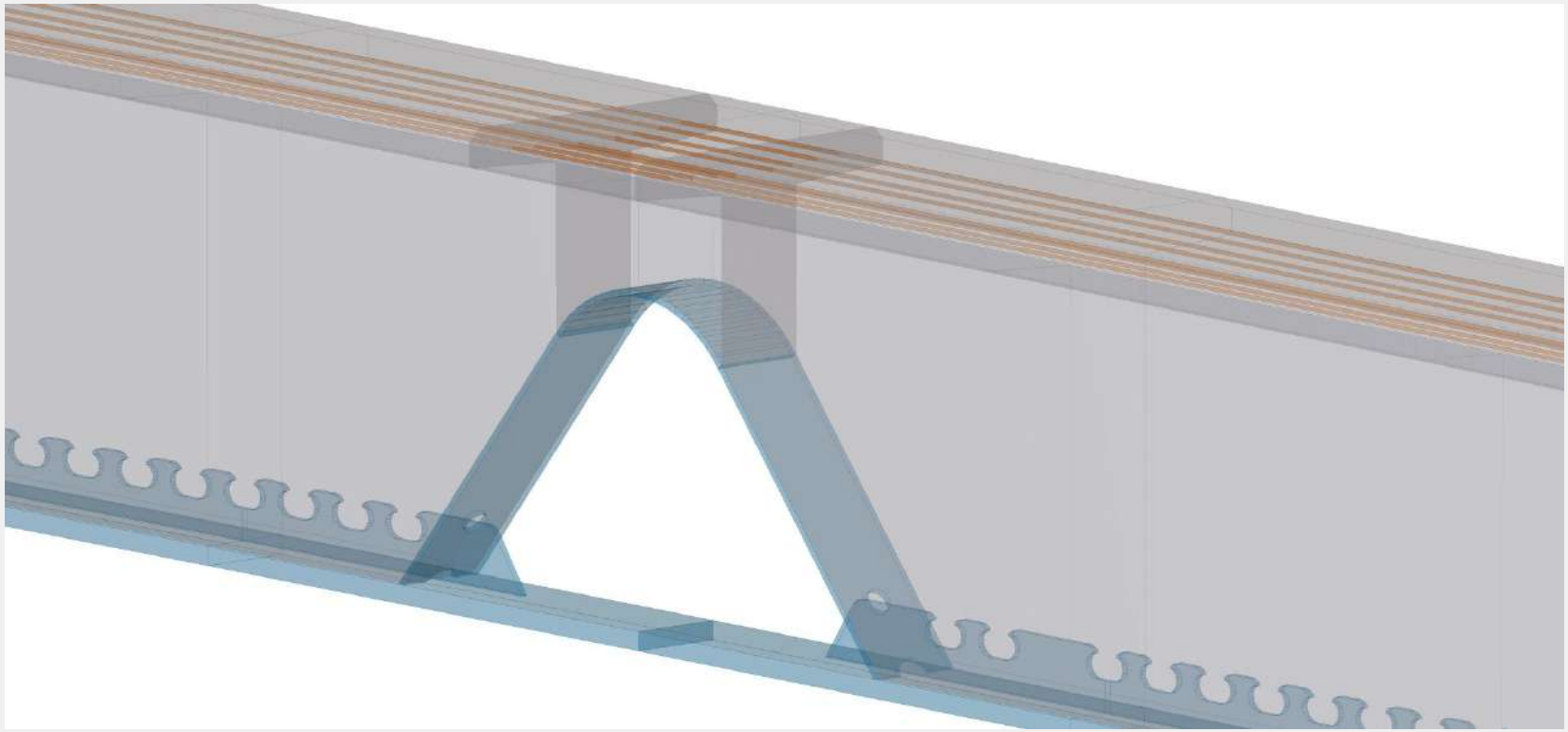
Bridge beams for 41 m span



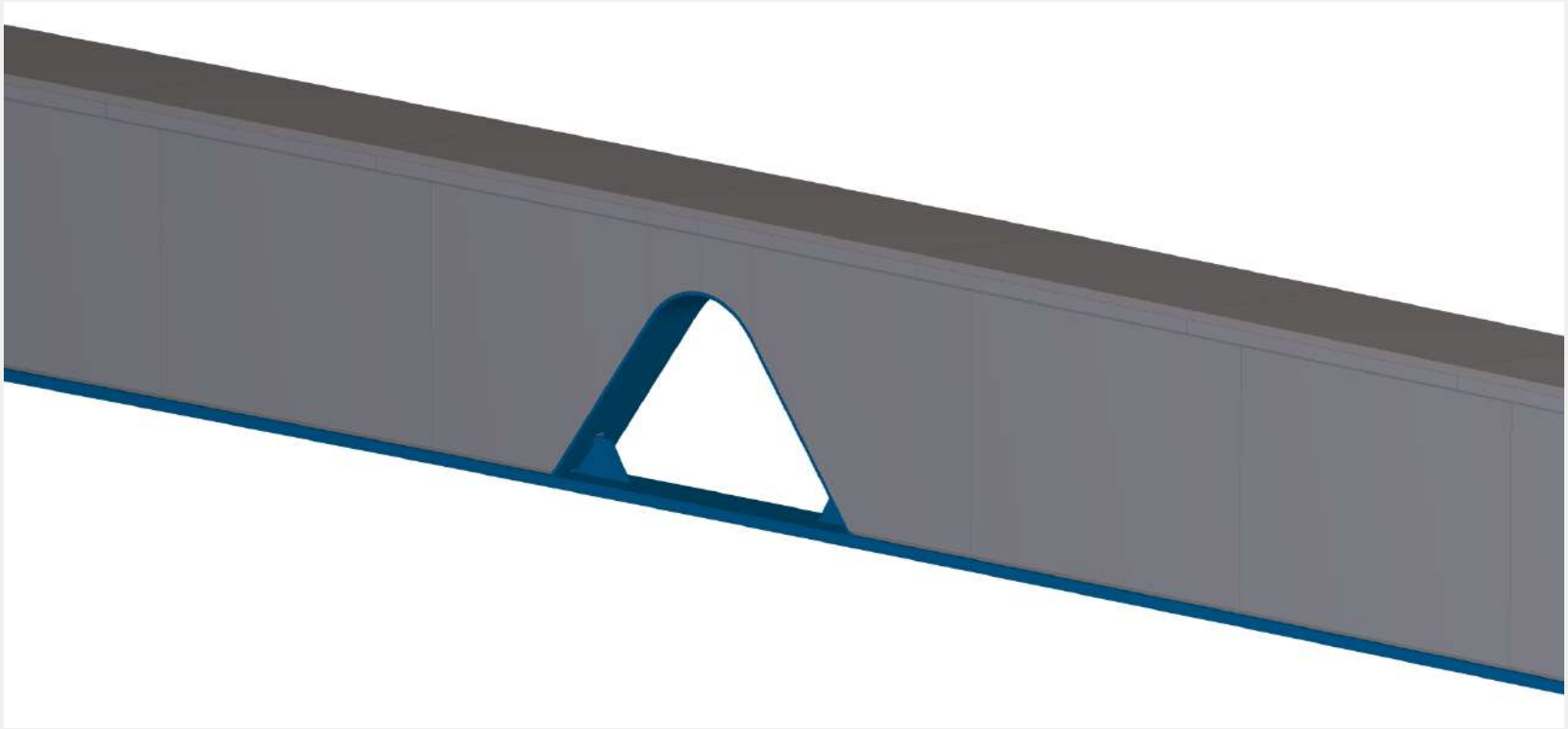
New construction method VFT-WIB®
Bridge beams for 41 m span



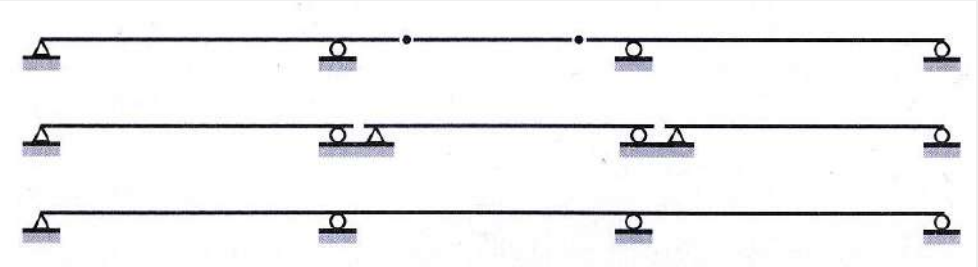
New construction method VFT-WIB®
Bridge beams for 41 m span



New construction method VFT-WIB®
Bridge beams for 41 m span



Safety in operation



Gerber Beam

S.S. Beam

C. Beam

Non robust system

Robust system

Example

Mississippibridge in Minneapolis, 1967,
140 m max. deschidere maximă, L_{tot}: 581 m

Example

Bridge Mississippi în Minneapolis, collaps 01.08.2007

Example Overpass Lecco - Italy

Overpass on road Lecco, collaps 28.08.2016

New construction method VFT-WIB®
Bridge beams for 41 m span

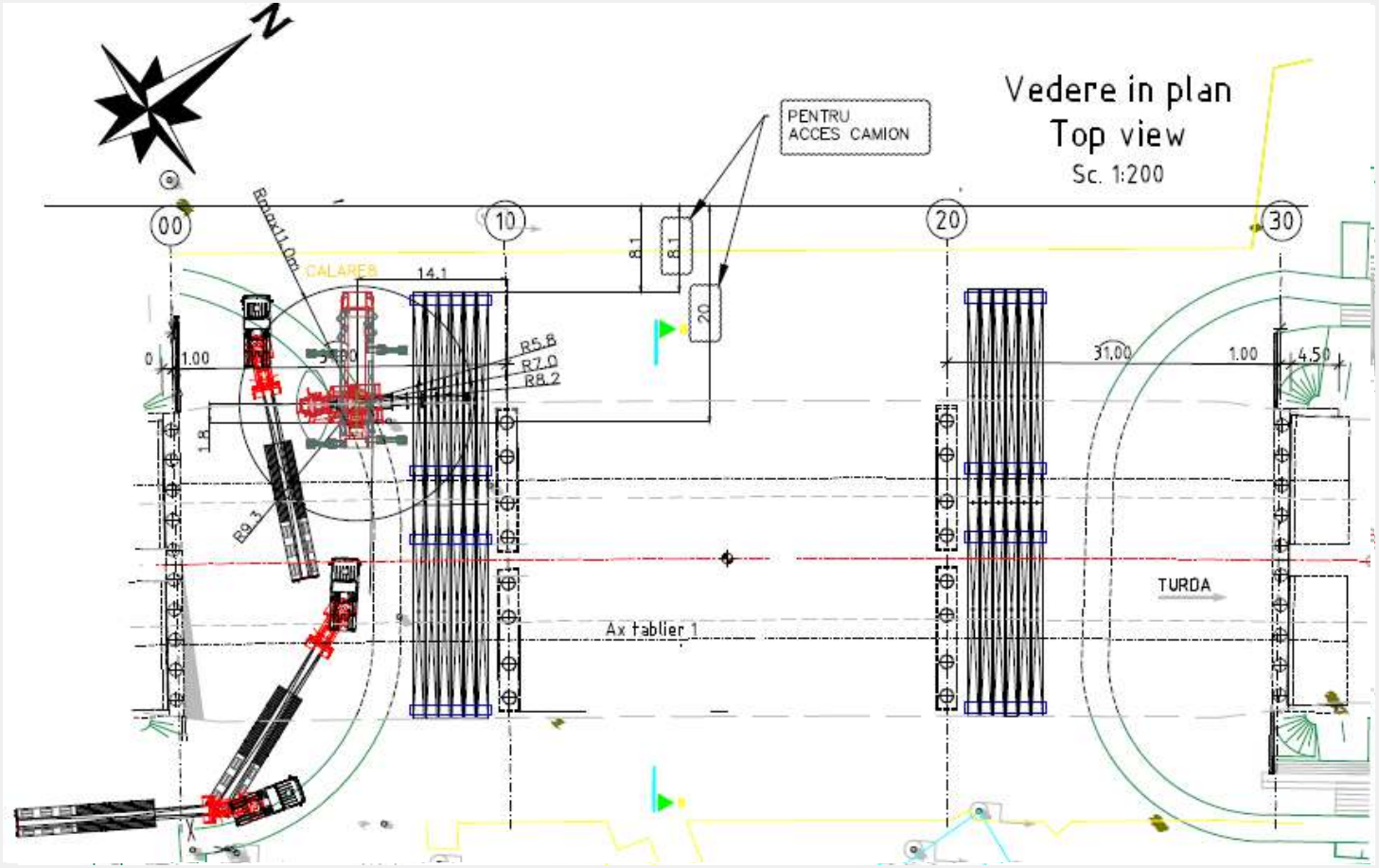
New construction method VFT-WIB®
Bridge beams for 41 m span

New construction method VFT-WIB®
Bridge beams for 41 m span

New construction method VFT-WIB®
Bridge beams for 41 m span

KRAN-SPEZIFIKATION 250 t
Radius: 7,2 / 9,6 / 10,6 m
Kapazität: 48 / 40 / 38 t

Gewicht der Halbträger: 31 t



New construction method VFT-WIB®
Bridge beams for 41 m span

Phase / Etapa		VFT-WIB Beams Bauelemente Grinzi *VFT-WIB Bauelemente* Transport / Unloading DEME site *Transport / Descarcare DEME santier*		BFT Beams and Plates Bauelemente Grinzi *BFT si predale Bauelemente* Transport / Unloading DEME site Transport / Descarcare DEME santier			BFT Beams and Plates Somaco Grinzi *BFT si predale Somaco* Transport / Unloading DEME site Transport / Descarcare DEME santier			
	Date / Data	Bridge no. *Nr. Pod*	No. of beams *Nr. grinzi*	Bridge no. *Nr. Pod*	No. of beams *Nr. grinzi*	No. of plates *Nr. predale*	Bridge no. *Nr. Pod*	No. of beams *Nr. grinzi*	No. of plates *Nr. predale*	Remarks *Comentari*
1	30.07.2018	29+050	3							
	31.07.2018	32+900	3							
	Sum / Suma (07/2018)		6							
	01.08.2018	27+745	3							
	02.08.2018	27+745	2							
	03.08.2018	35+600	4							
	04.08.2018	35+600	1							
		27+100	3							
2	20.08.2018			34+750	12					
	21.08.2018	39+580	3							
		40+100	1							
	22.08.2018	40+100	4							
	23.08.2018	24+450	5							
	24.08.2018			34+750	8					
	Sum / Suma (08/2018)		26		20					
3	17.09.2018	25+100	6							
	18.09.2018	25+100	6							
	19.09.2018			34+750	12					

New construction method VFT-WIB®
Bridge beams for 41 m span

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Bridge beams for 41 m span

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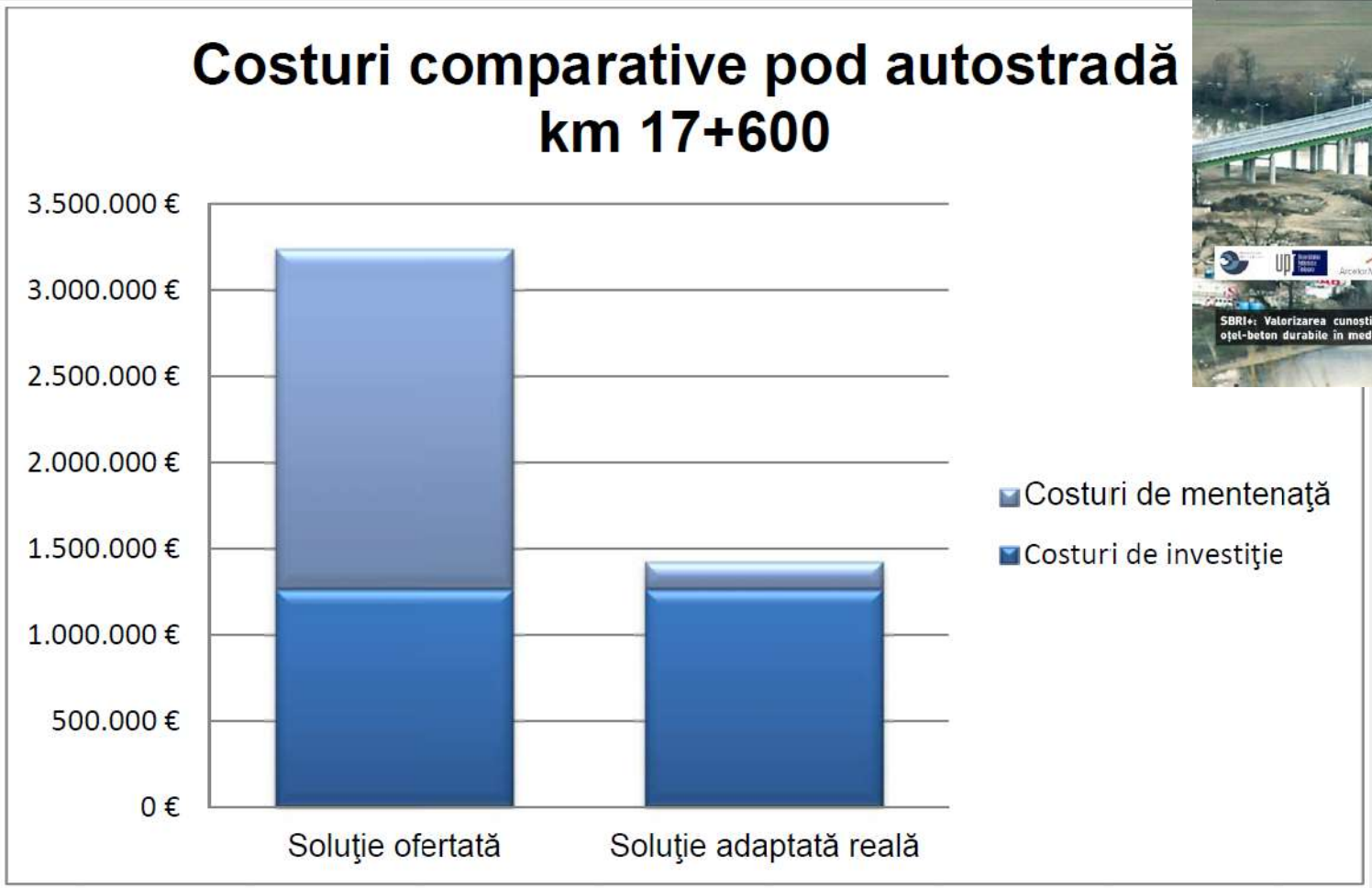
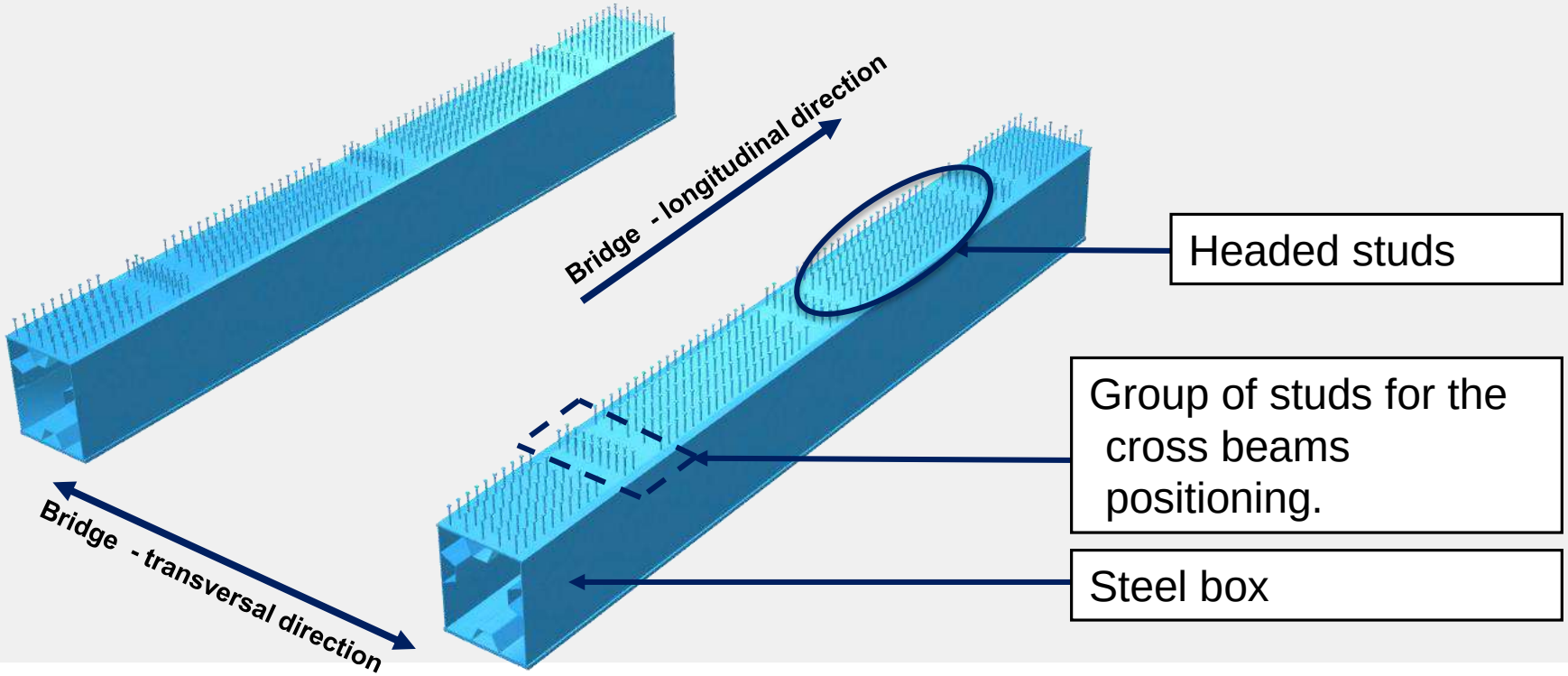
Bridge beams for 41 m span



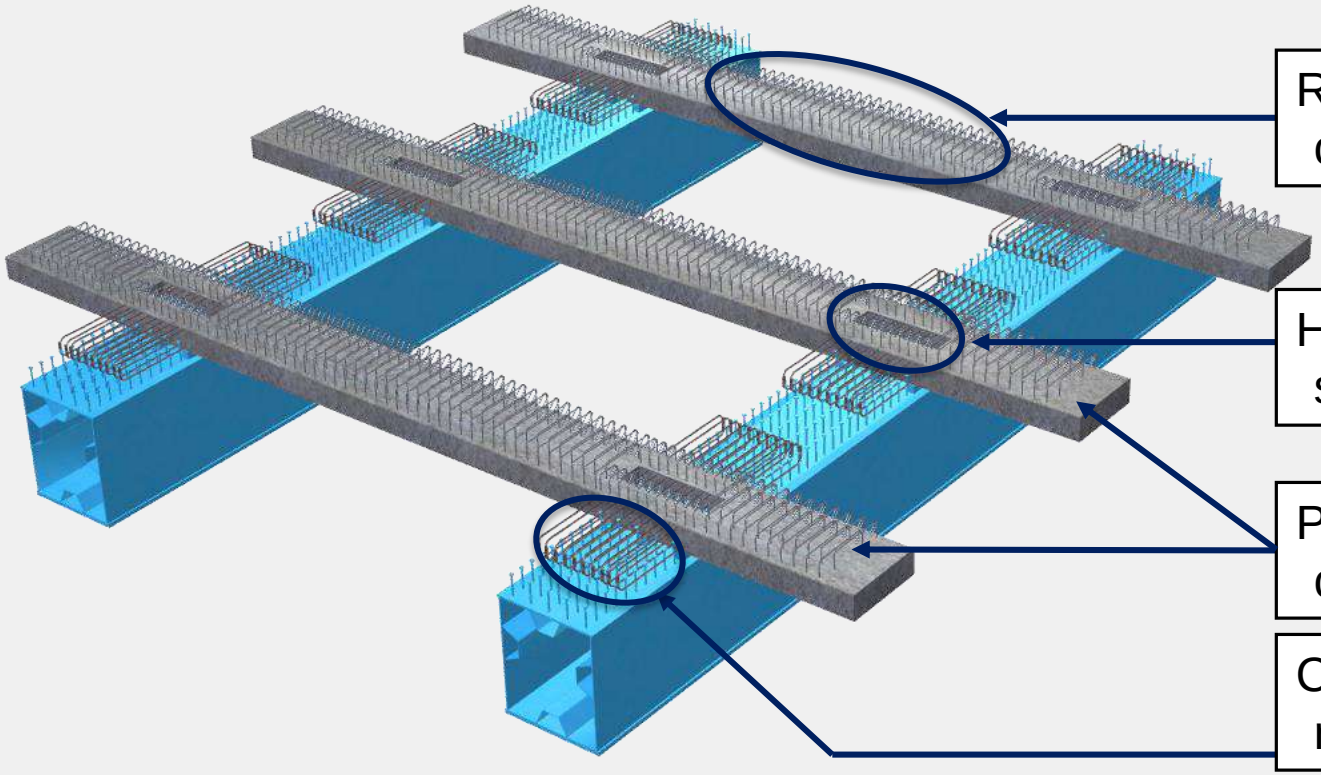
De ce SSF Rapid ???

1 Steel structure



De ce SSF Rapid ???

2 Arrangement of the precast concrete cross beams



Reinforcement - connectors

Holes left for the in-situ concrete

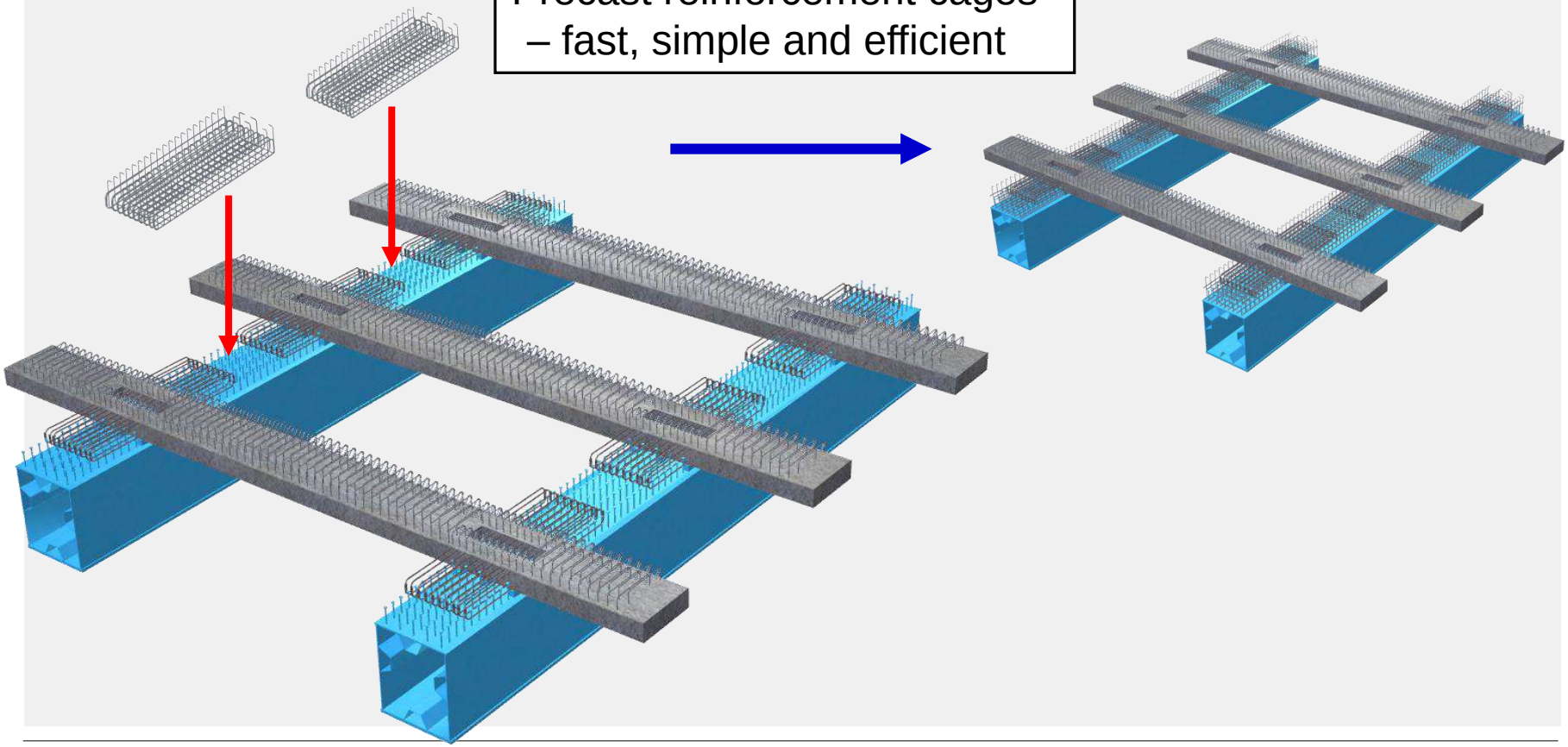
Precast concrete cross beams

Continuity reinforcement

De ce SSF Rapid ???

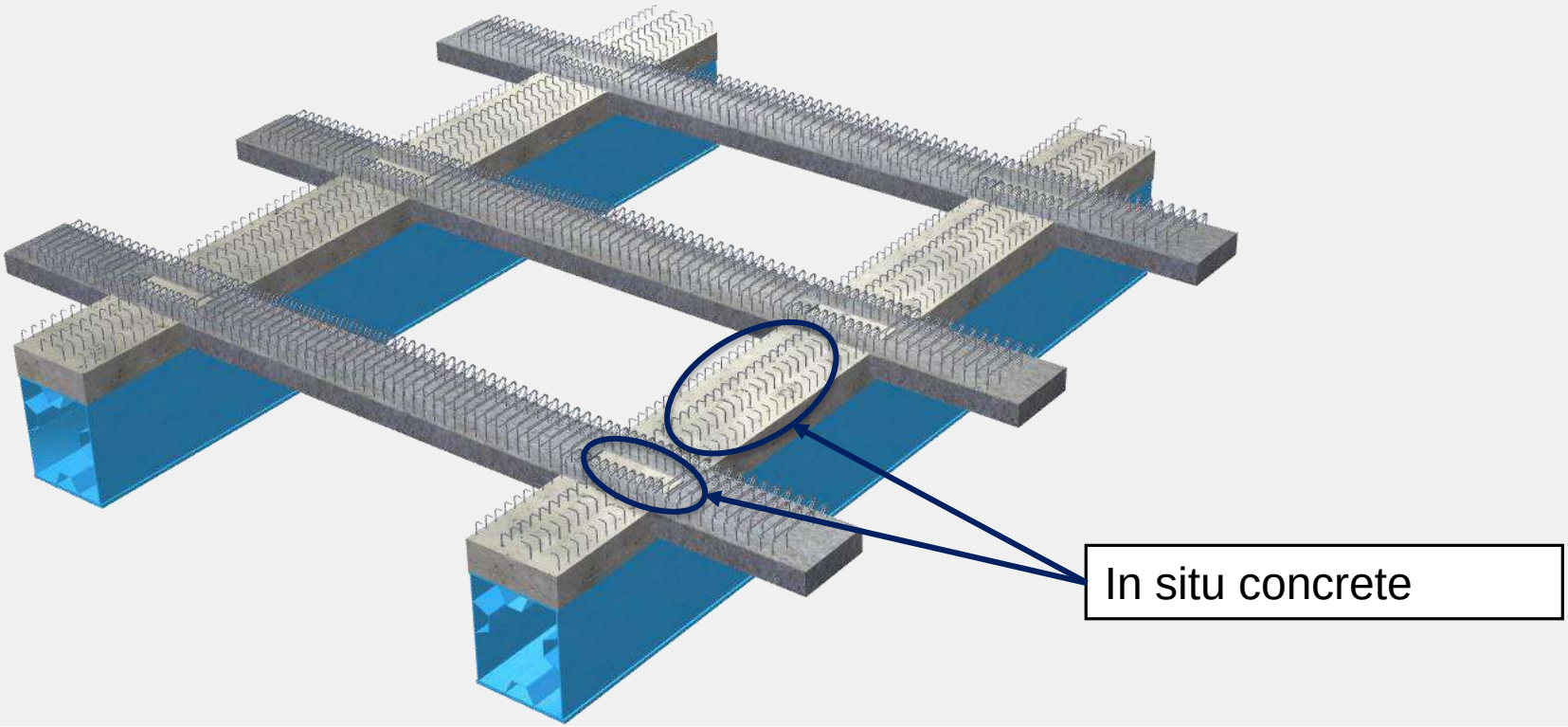
3 Longitudinal reinforcement

Precast reinforcement cages
– fast, simple and efficient



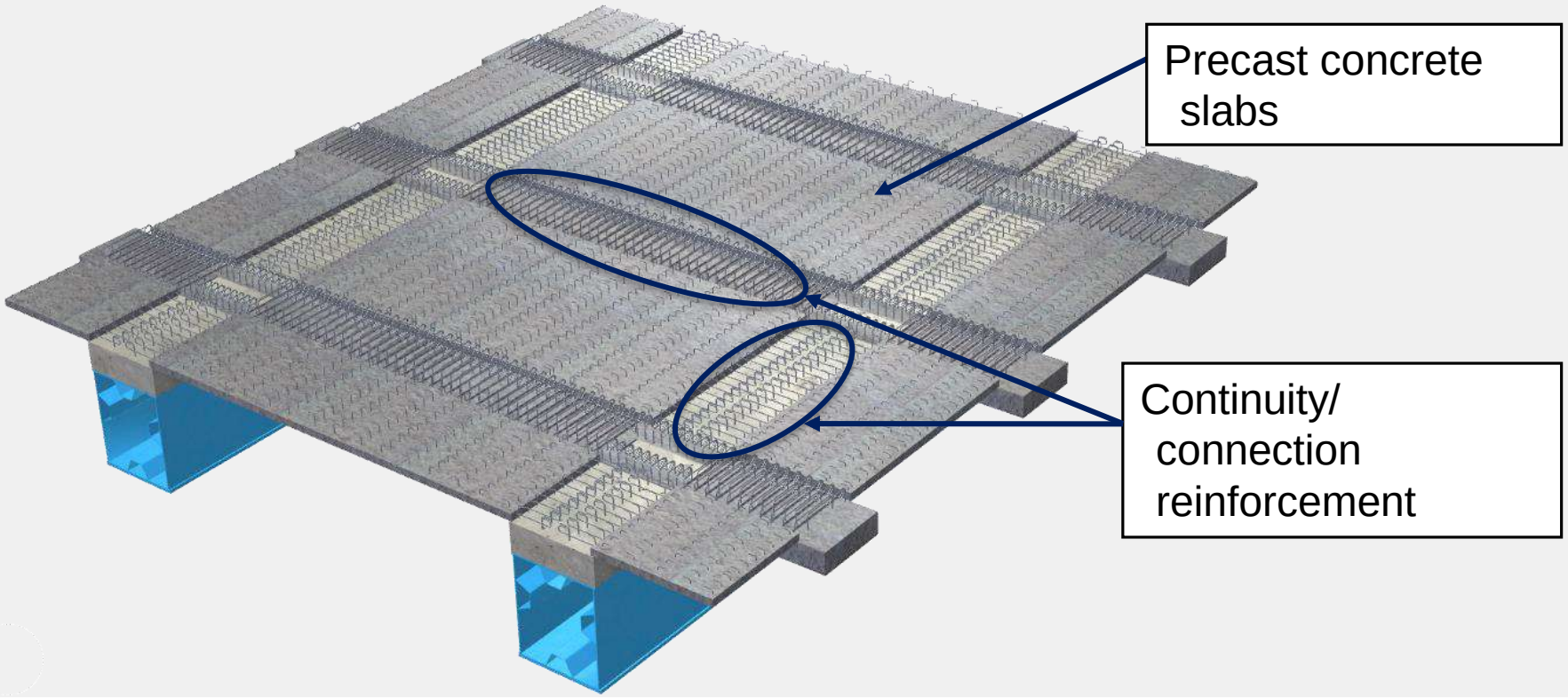
De ce SSF Rapid ???

4 In-situ concrete phase I – Girder system



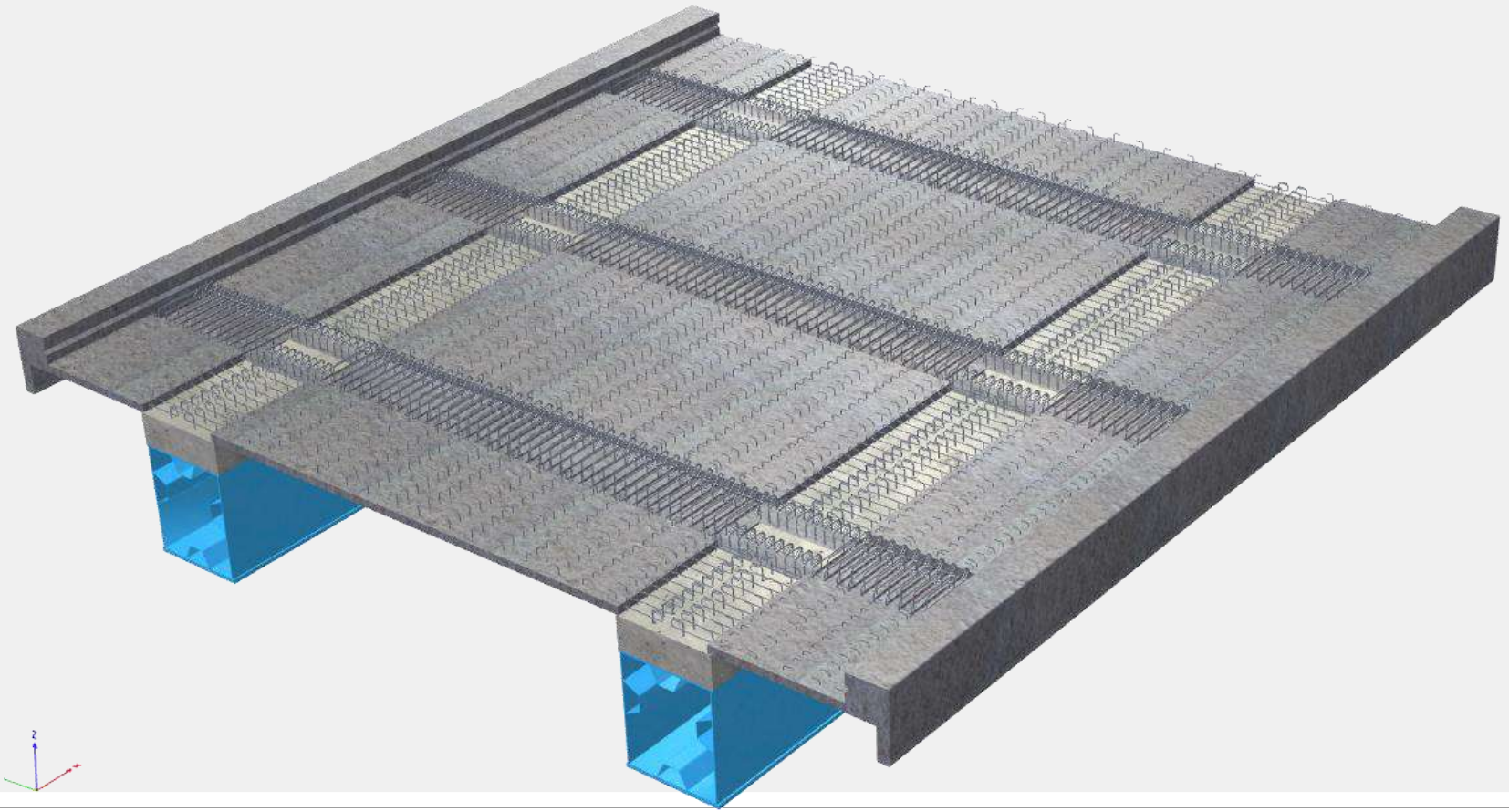
De ce SSF Rapid ???

5 Mounting of the precast concrete slab elements



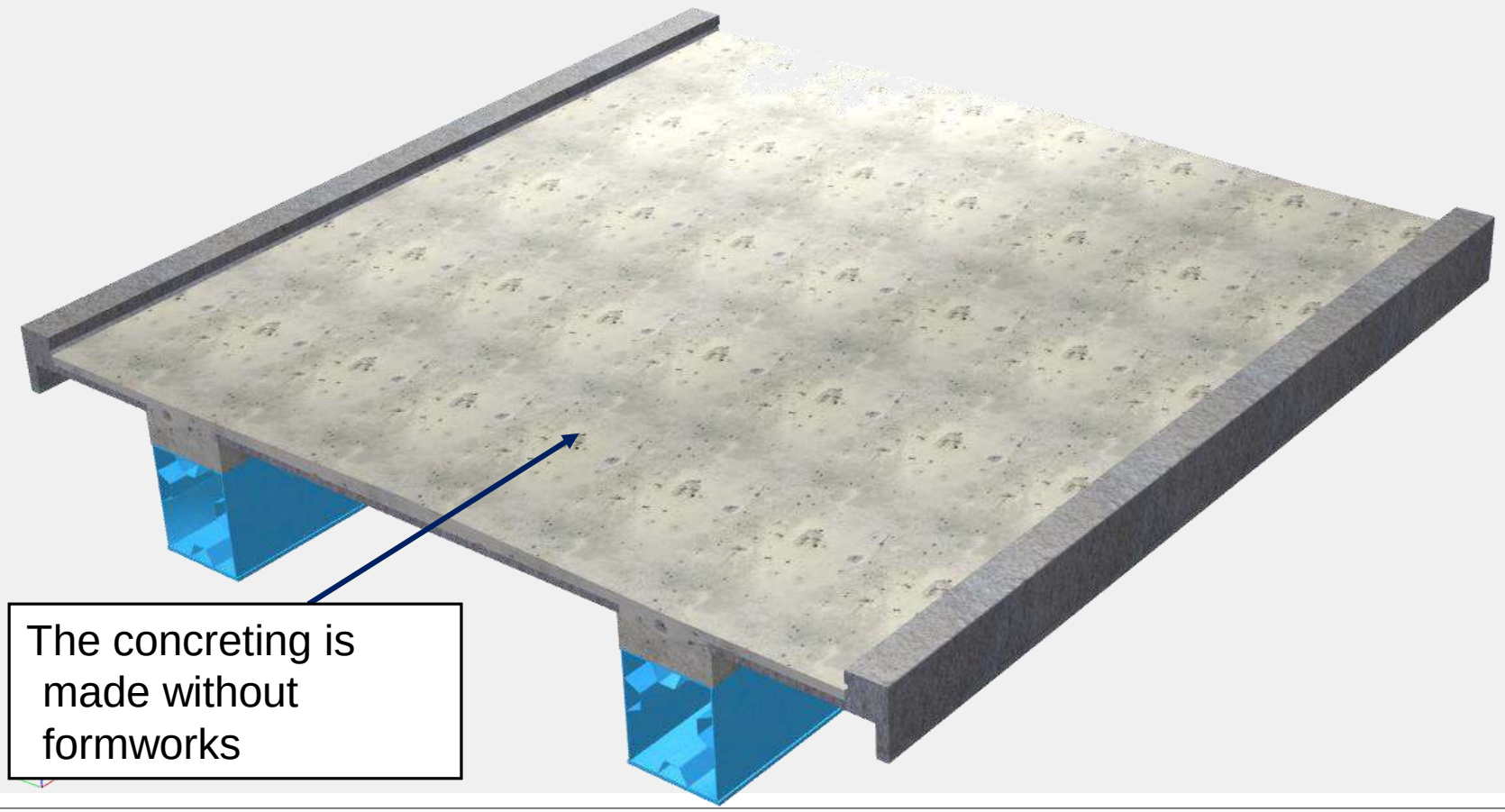
De ce SSF Rapid ???

6 Mounting of the precast side caps



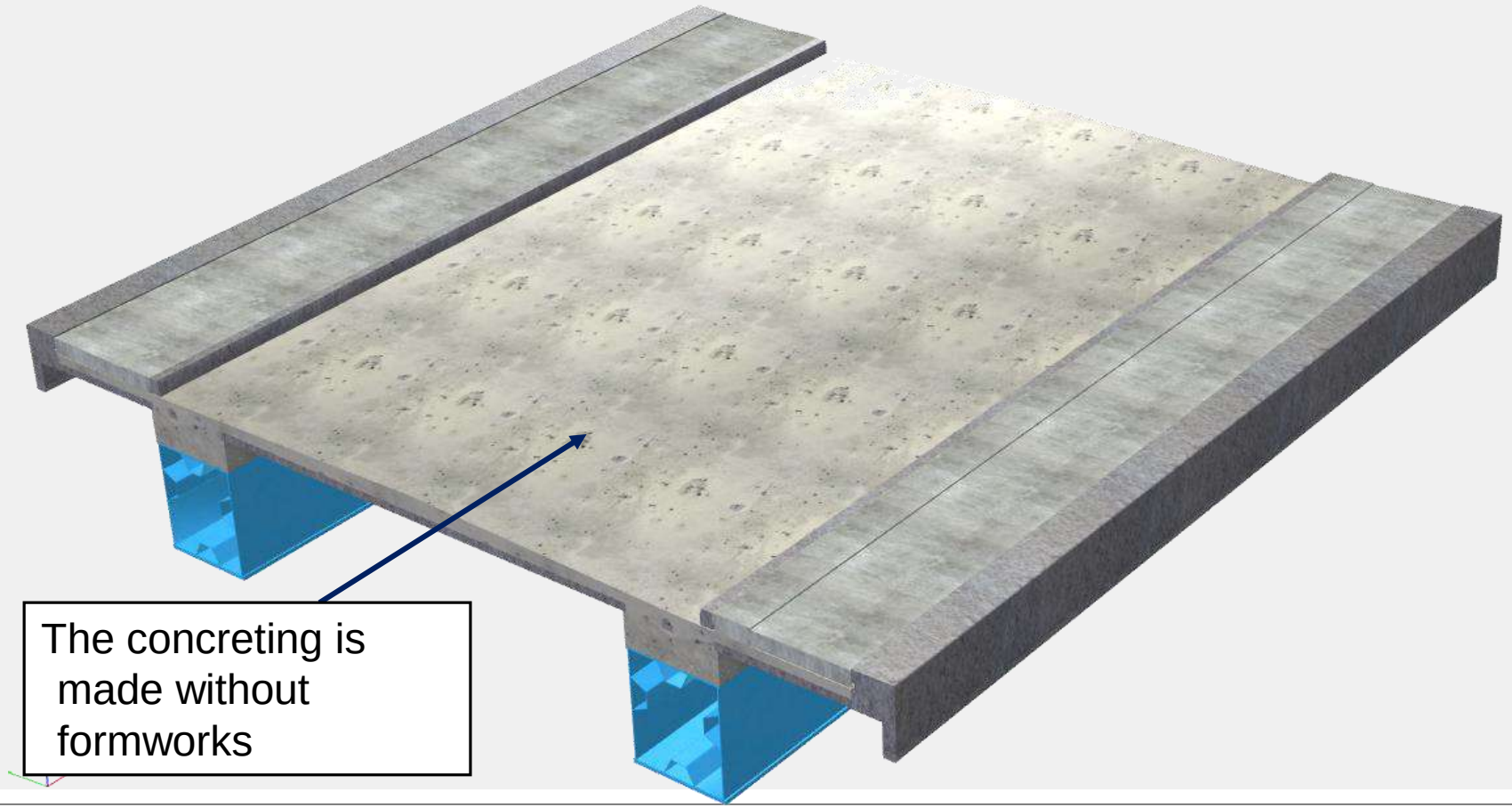
De ce SSF Rapid ???

7 In-situ concrete zone phase II



De ce SSF Rapid ???

7 In-situ concrete zone phase II

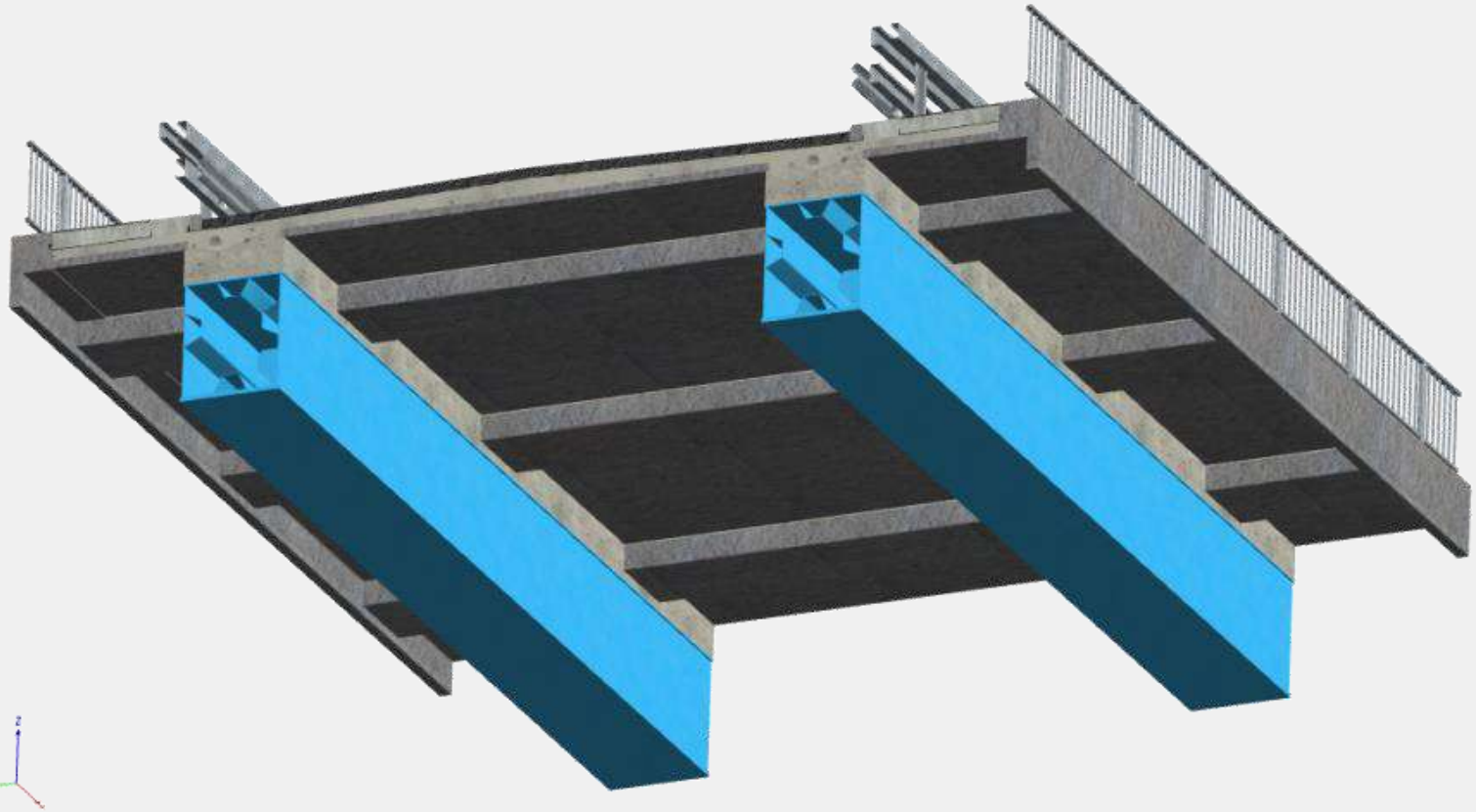


De ce SSF Rapid ???

8 Bridge equipment

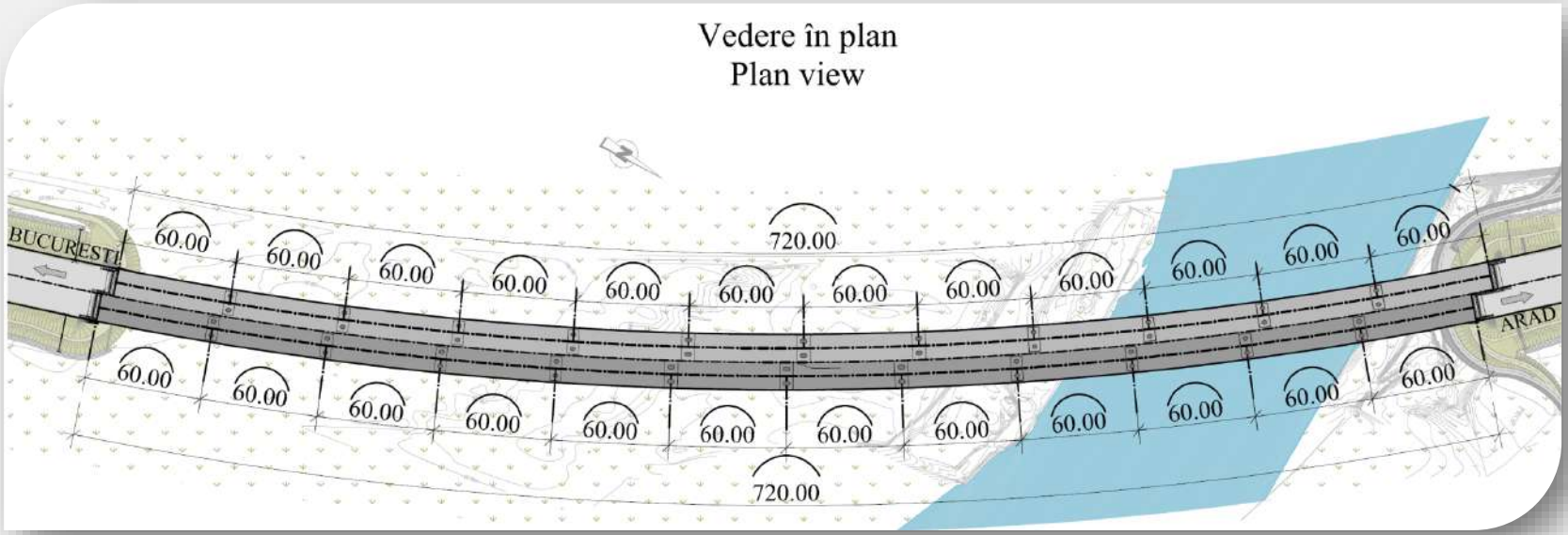
De ce SSF Rapid ???

Final structure – robust, simple, efficient.



VTR® bridges in Romania

1. Deva Bypass over Mureș River



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VTR® bridges in Romania

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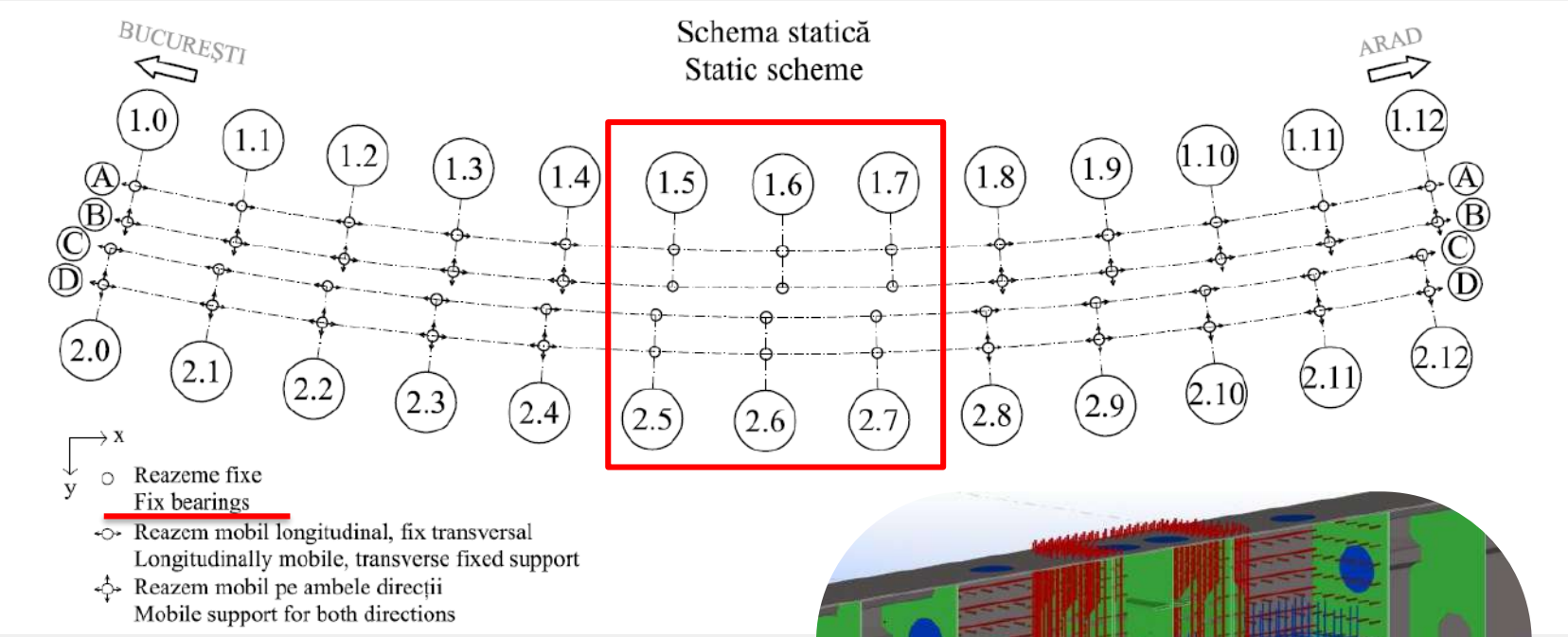

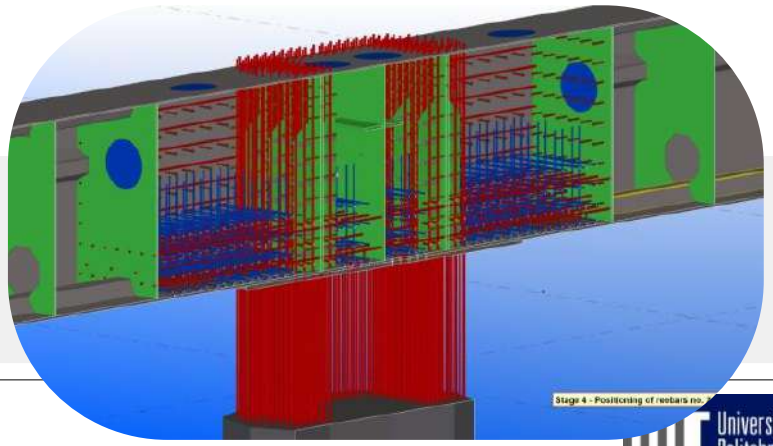

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VTR® bridges in Romania

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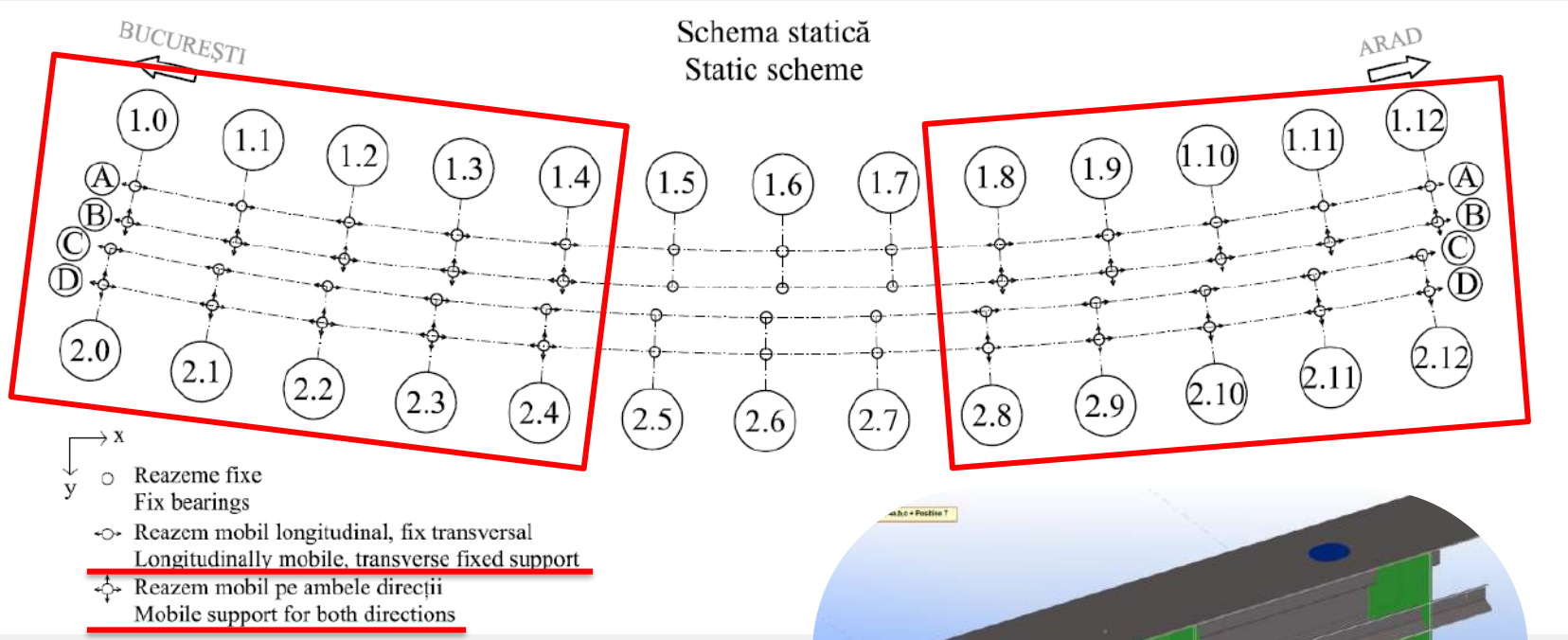

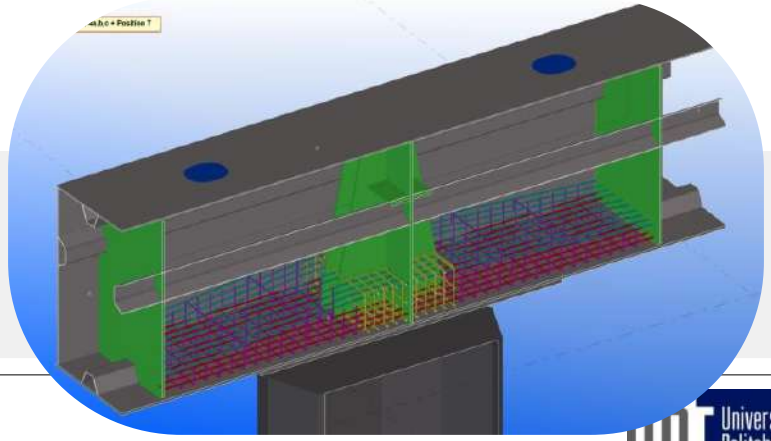

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VTR® bridges in Romania

1. Deva Bypass over Mureș River

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VTR® bridges in Romania

1. Deva Bypass over Mureș River

VTR® bridges in Romania

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VTR® bridges in Romania

1. Deva Bypass over Mureș River

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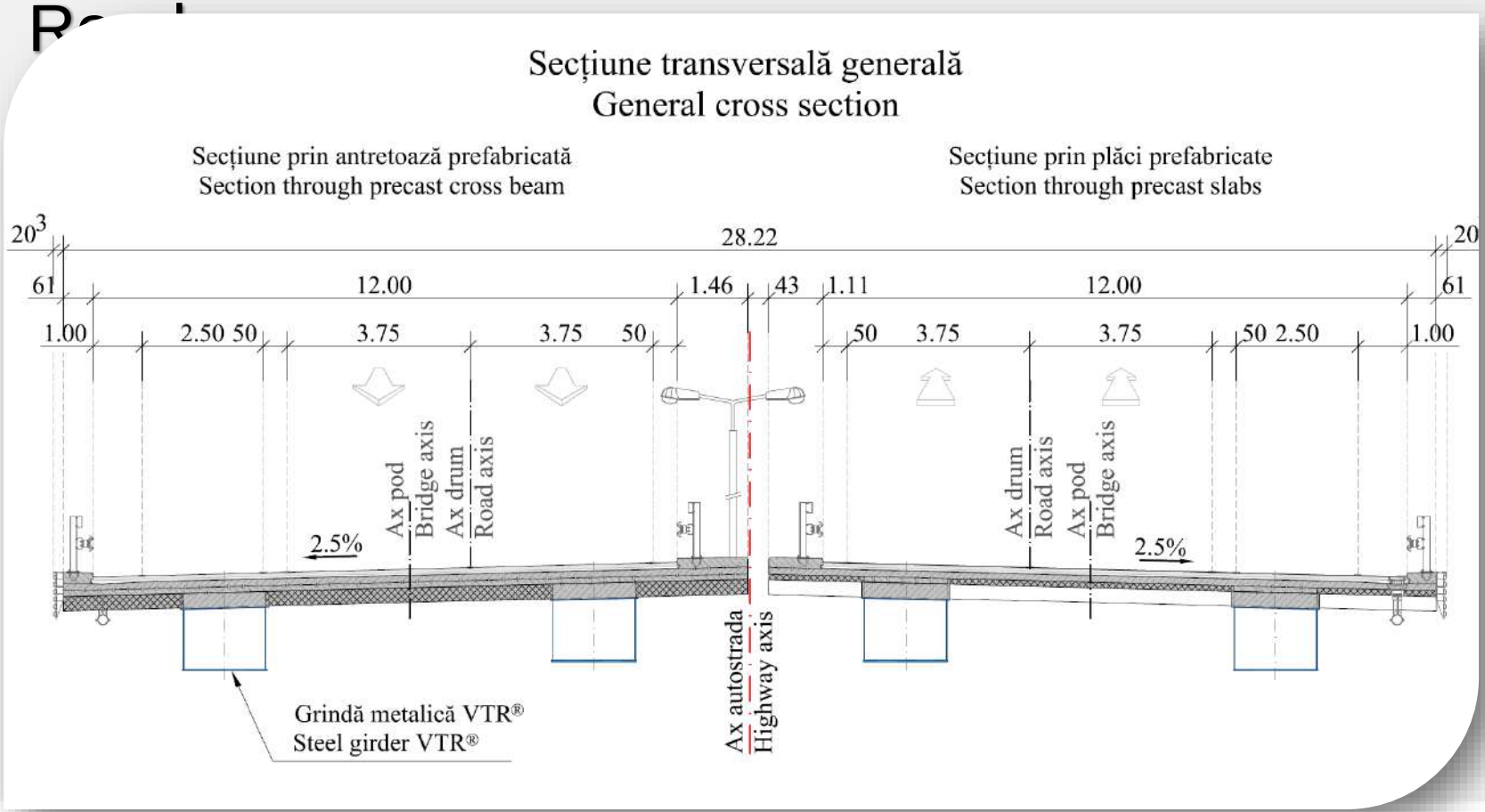
VTR® bridges in Romania

2. Orăștie Viaduct over Railway and National R



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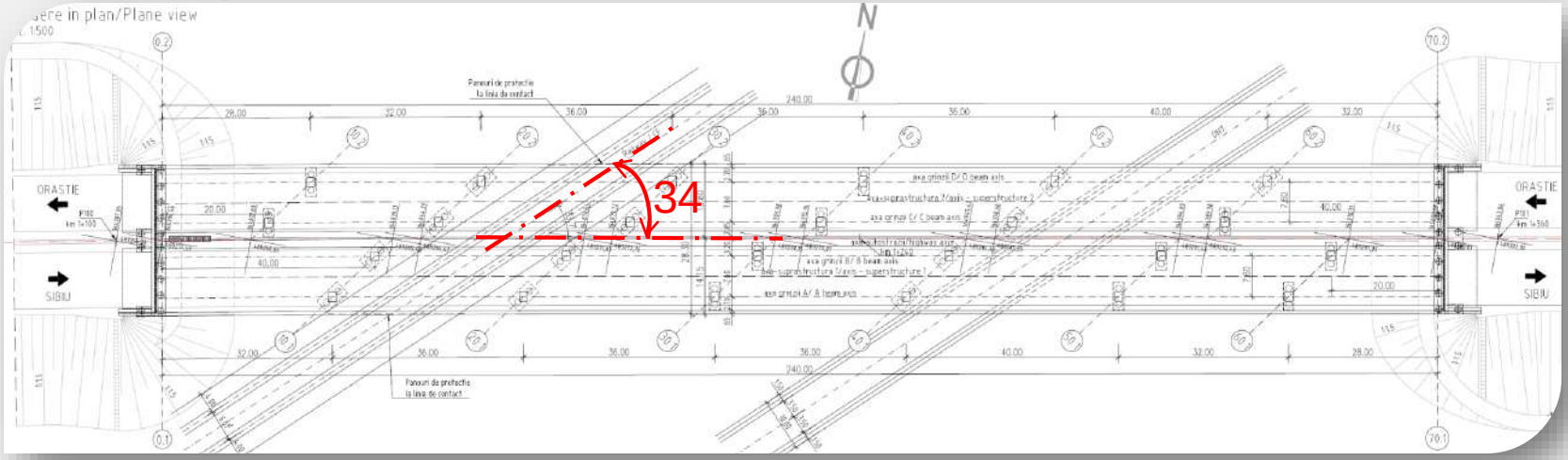
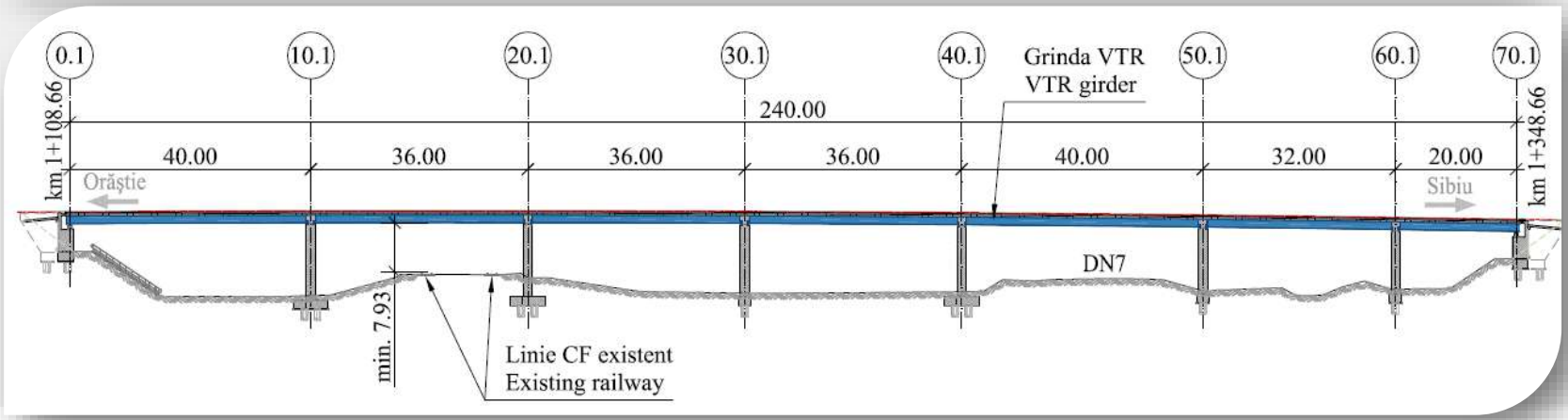
VTR® bridges in Romania

2. Orăștie Viaduct over Railway and National Road





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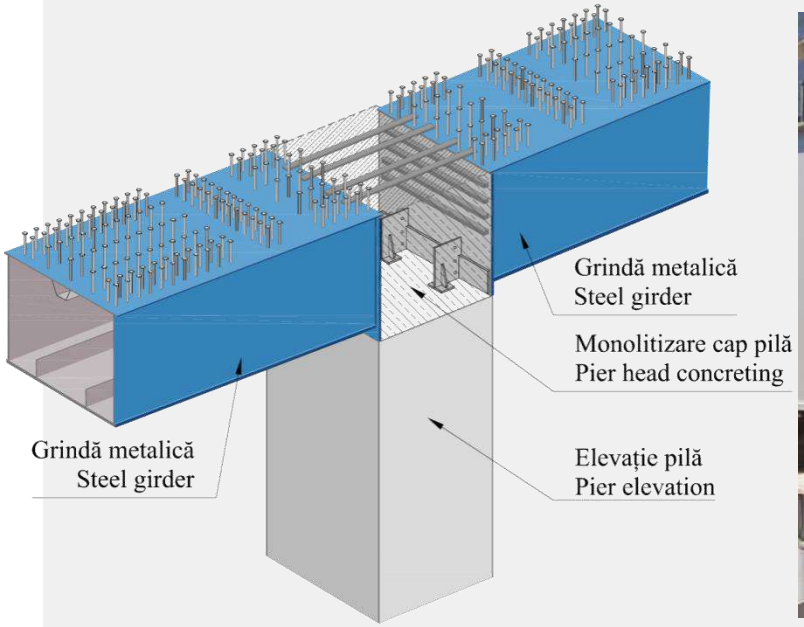
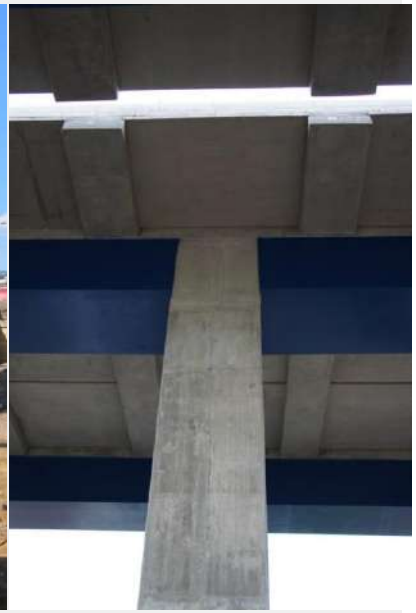
VTR® bridges in Romania

2. Orăștie Viaduct over Railway and National Road
Pier head



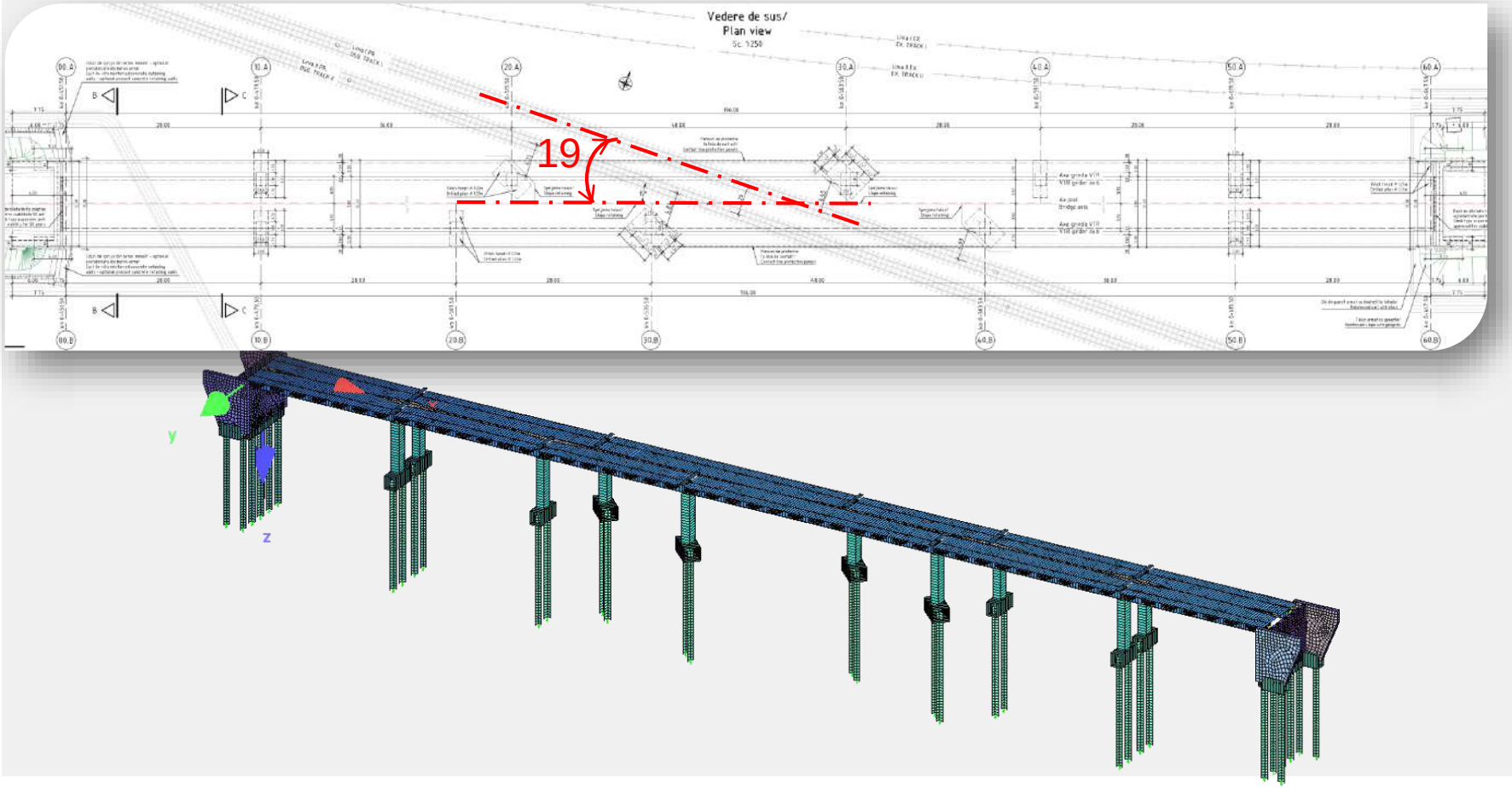


VTR® bridges in Romania

2. Orăștie Viaduct over Railway and National Road

VTR® bridges in Romania

3. Railway Overpass on Simeria-Vințu de Jos at km 457+431



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VTR® bridges in Romania

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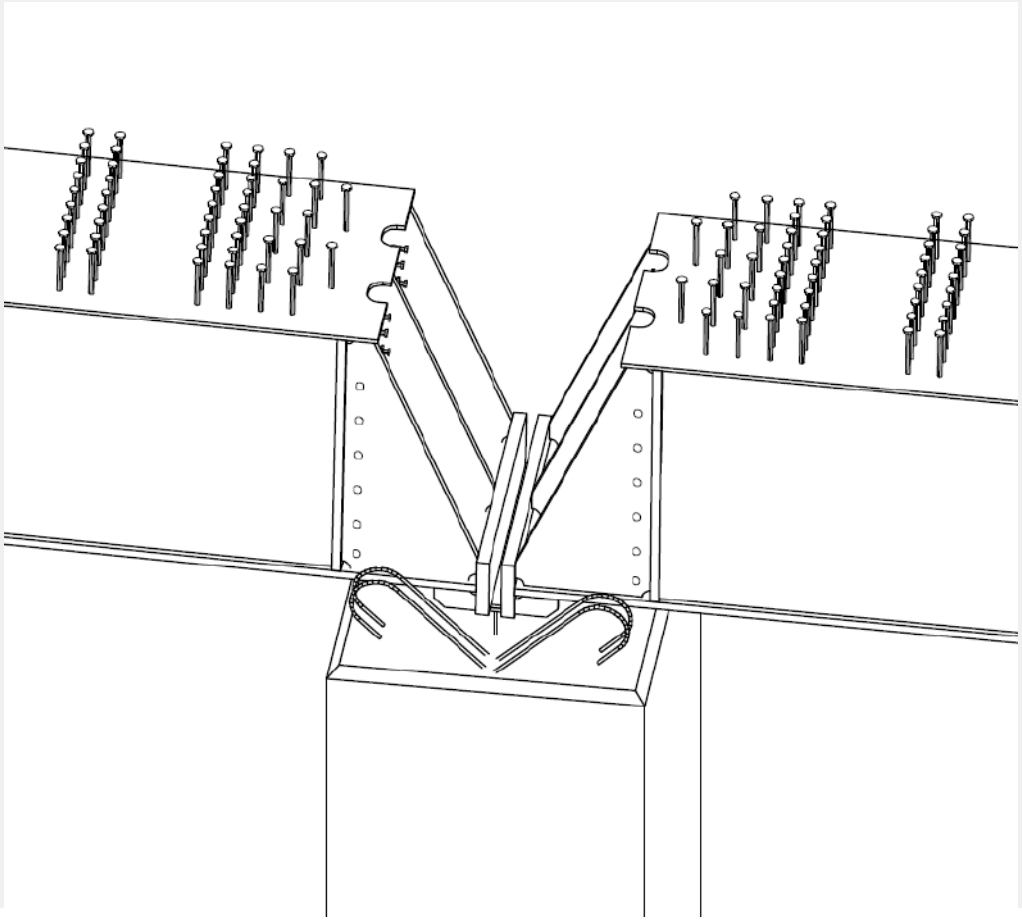
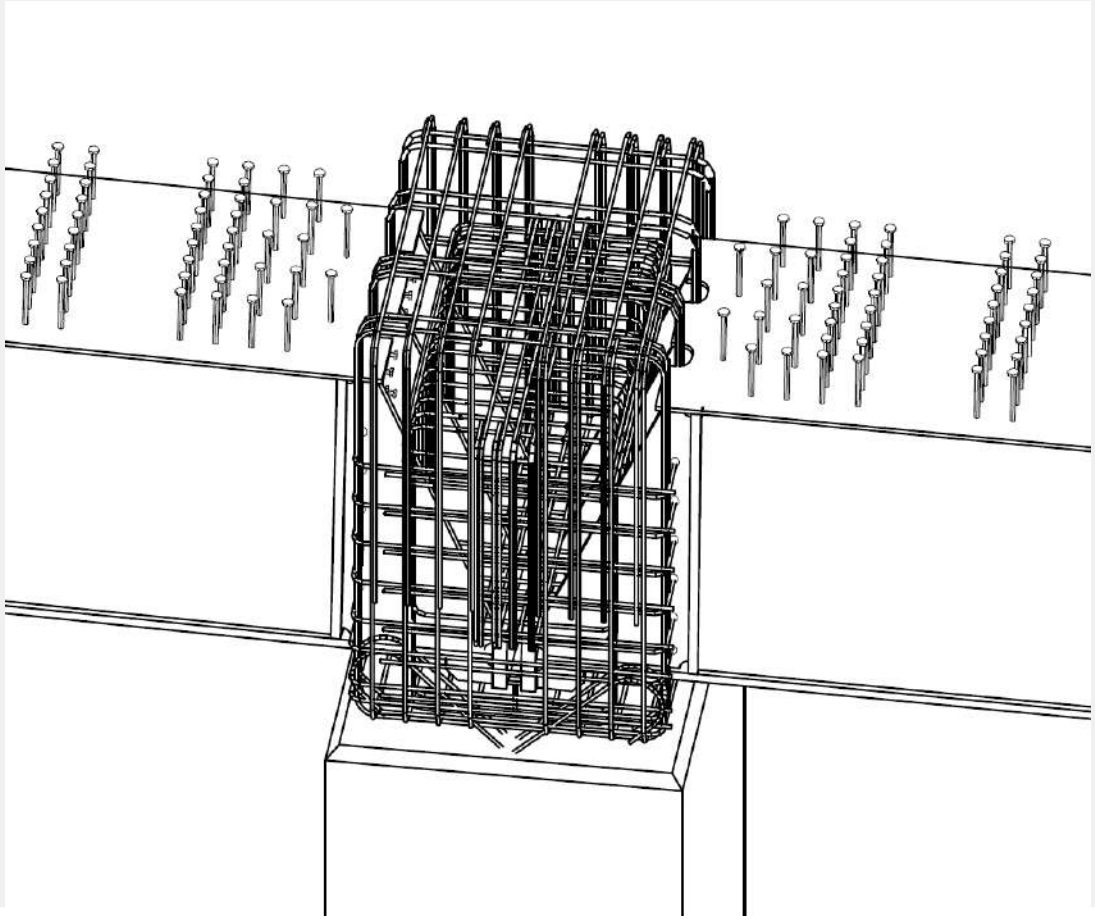


VTR® bridges in Romania

3. Railway Overpass on Simeria-Vințu de Jos at km 457+431



VTR® bridges in Romania

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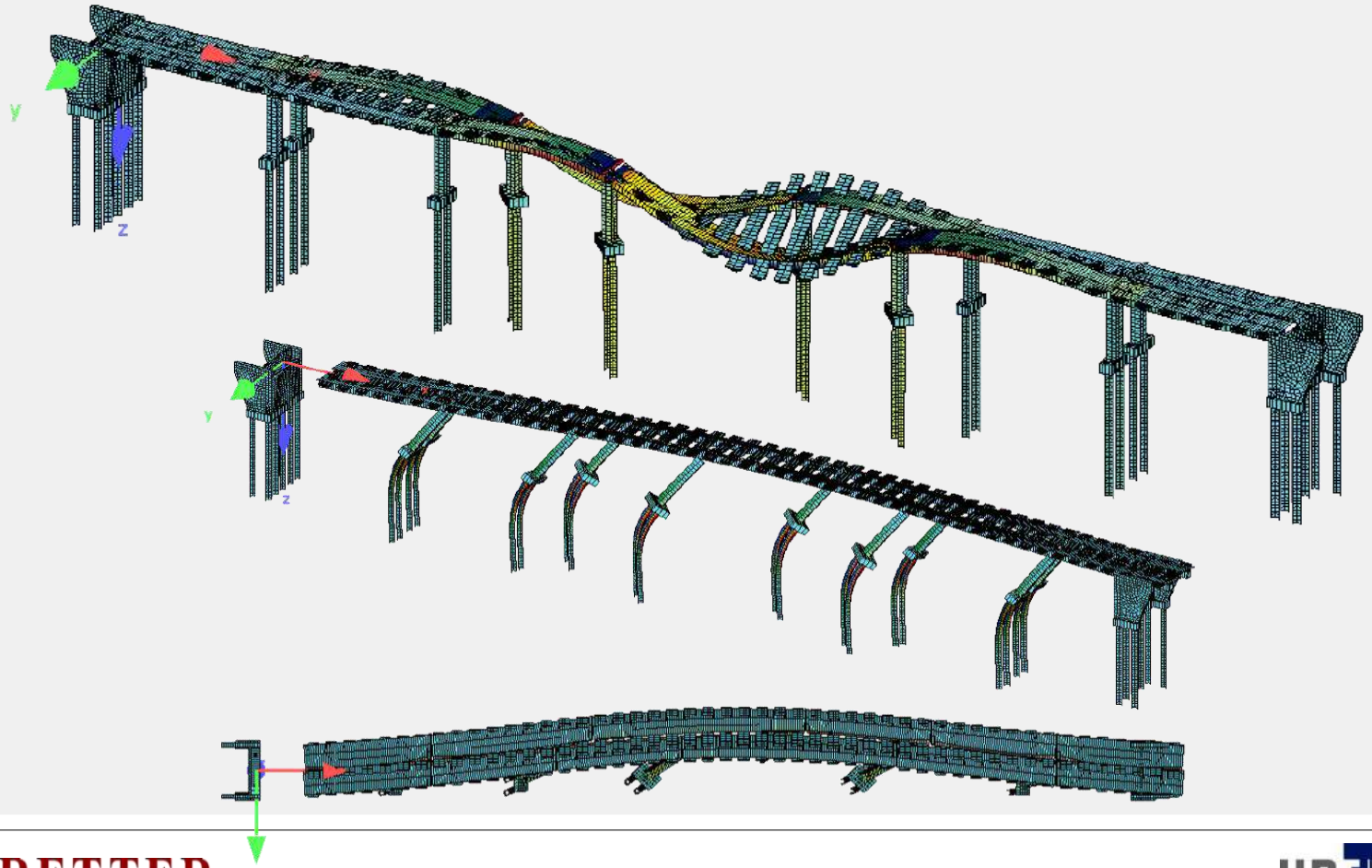
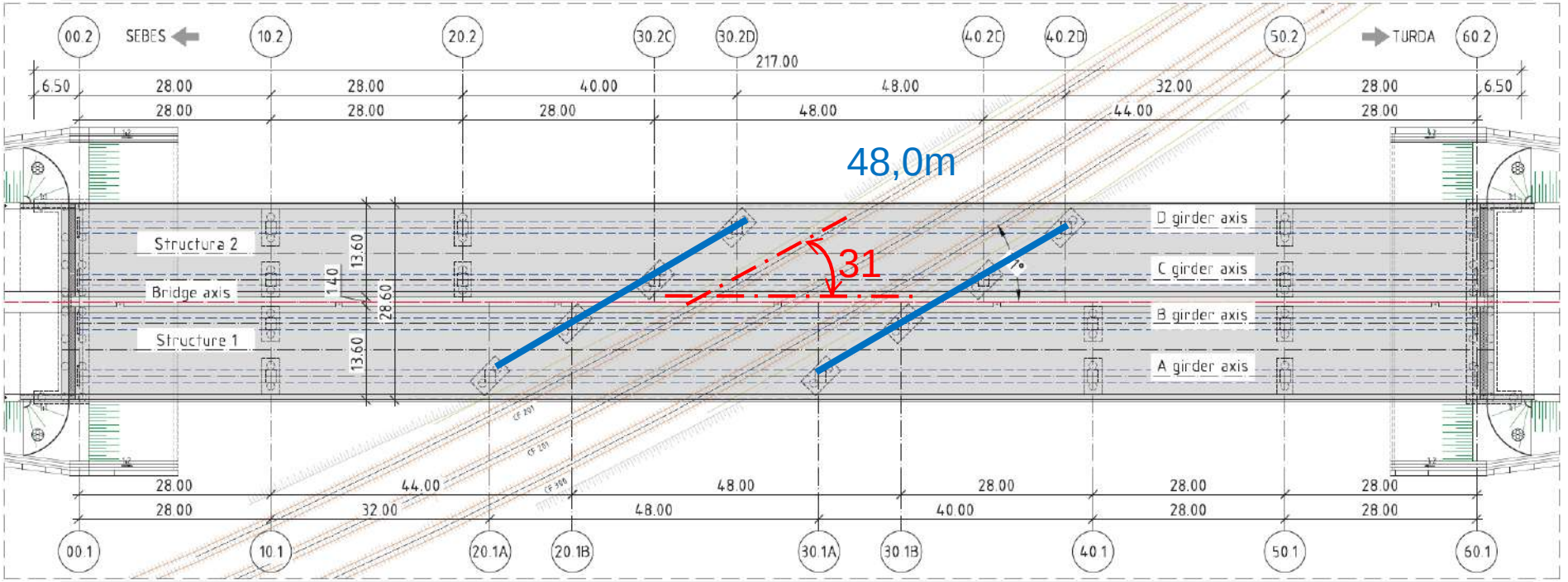


VTR® bridges in Romania

3. Railway Overpass on Simeria-Vințu de Jos at km 457+431

Ongoing projects

1. Skew Motorway Bridge over Railway at km 26+350 on the Sebeș-Turda Motorway, lot 2



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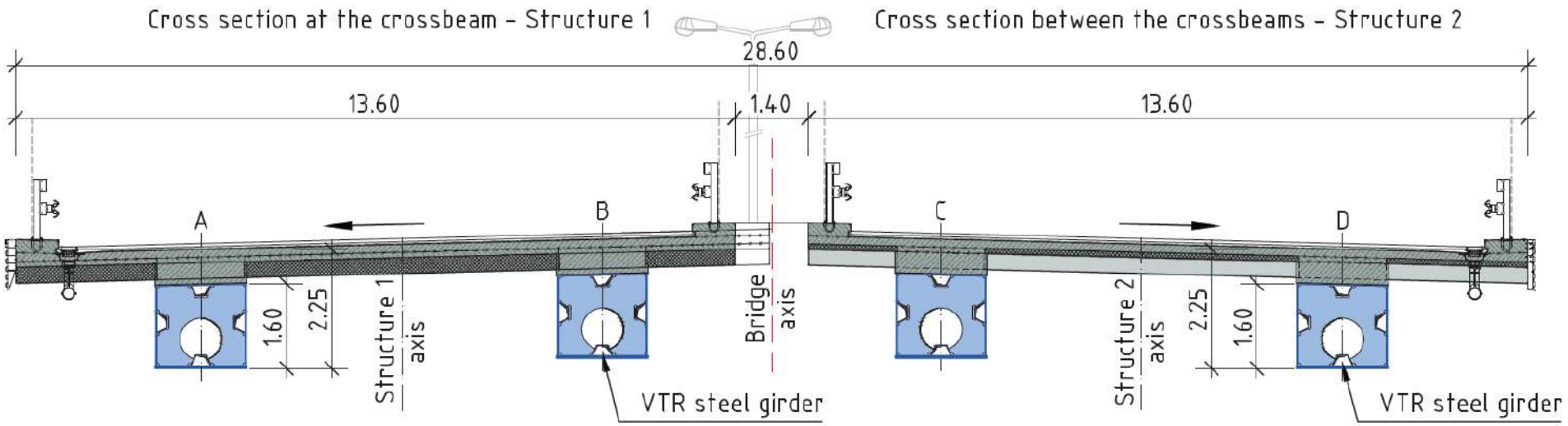
Ongoing projects

1. Skew Motorway Bridge over Railway at km 26+350 on the Sebeș-Turda Motorway, lot 2



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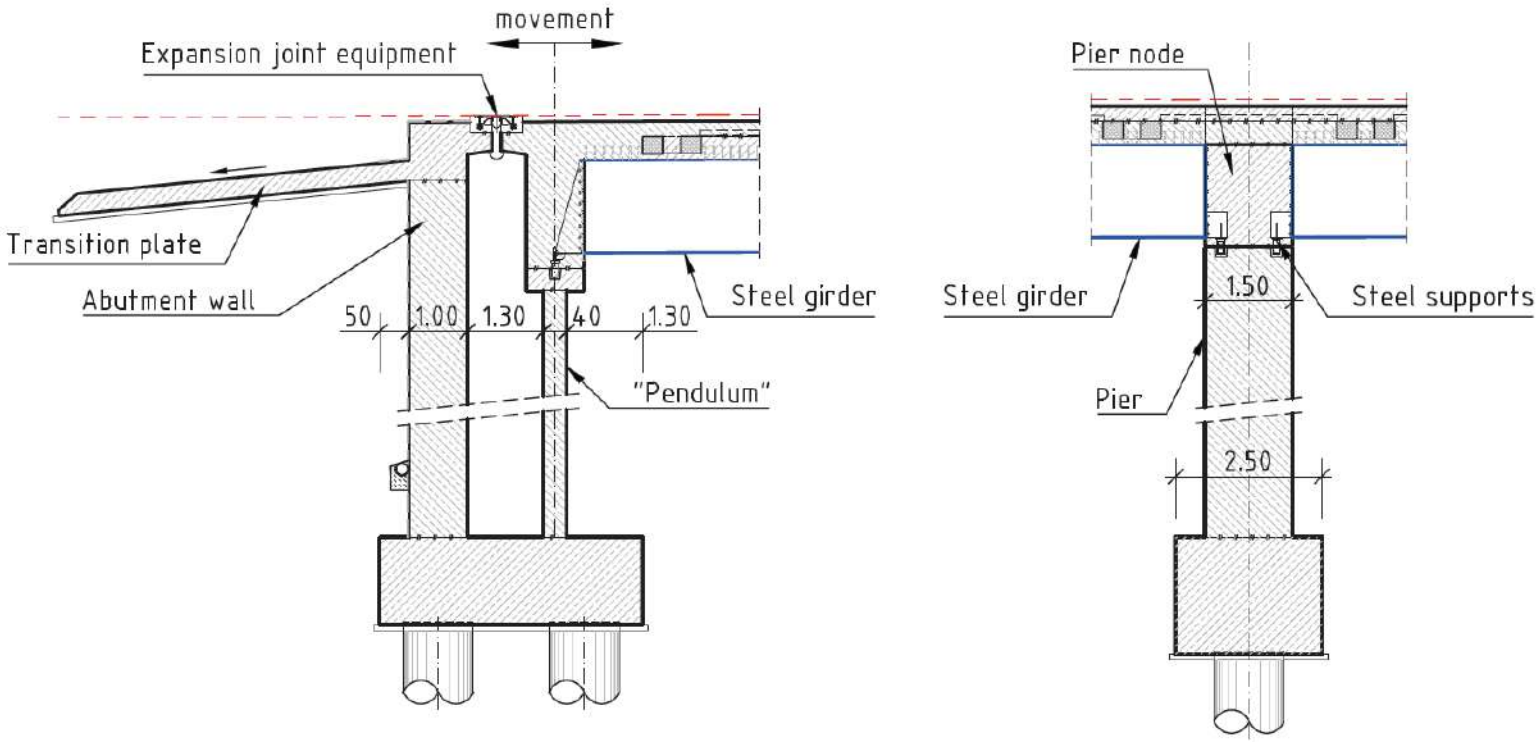
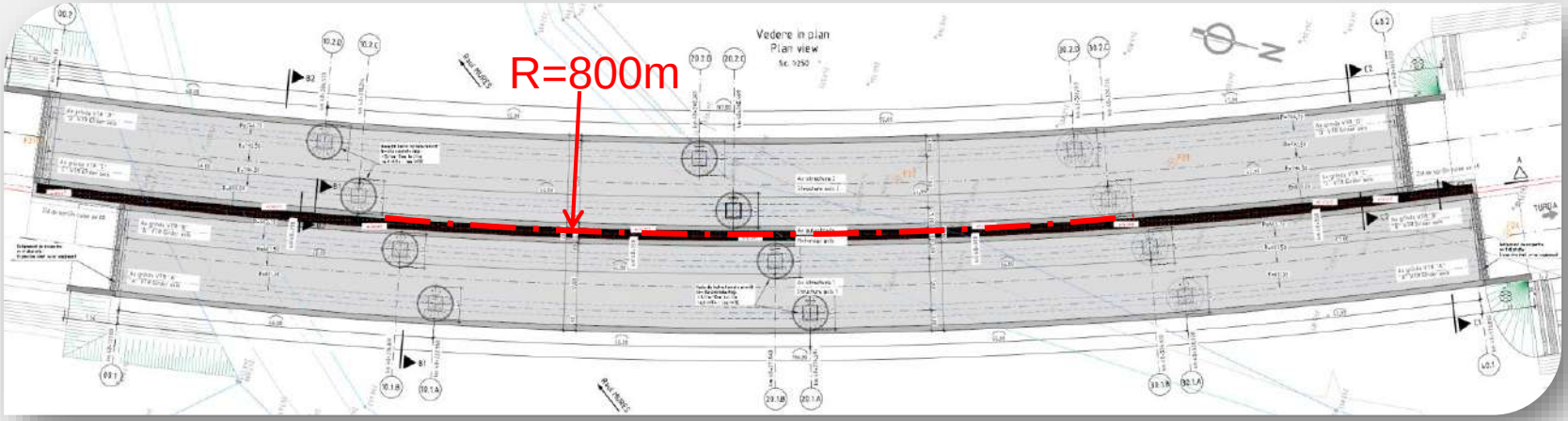
Ongoing projects

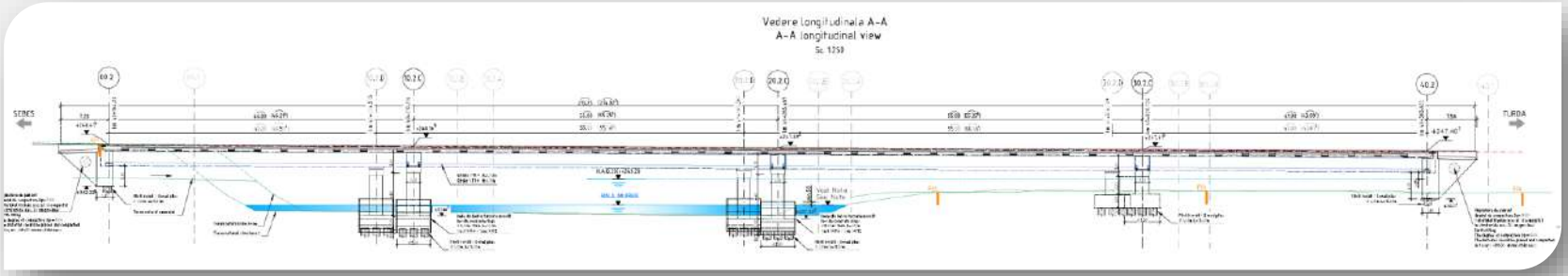
1. Skew Motorway Bridge over Railway at km 26+350 on the Sebeș-Turda Motorway, lot 2
Sub- to superstructure connection



Ongoing projects

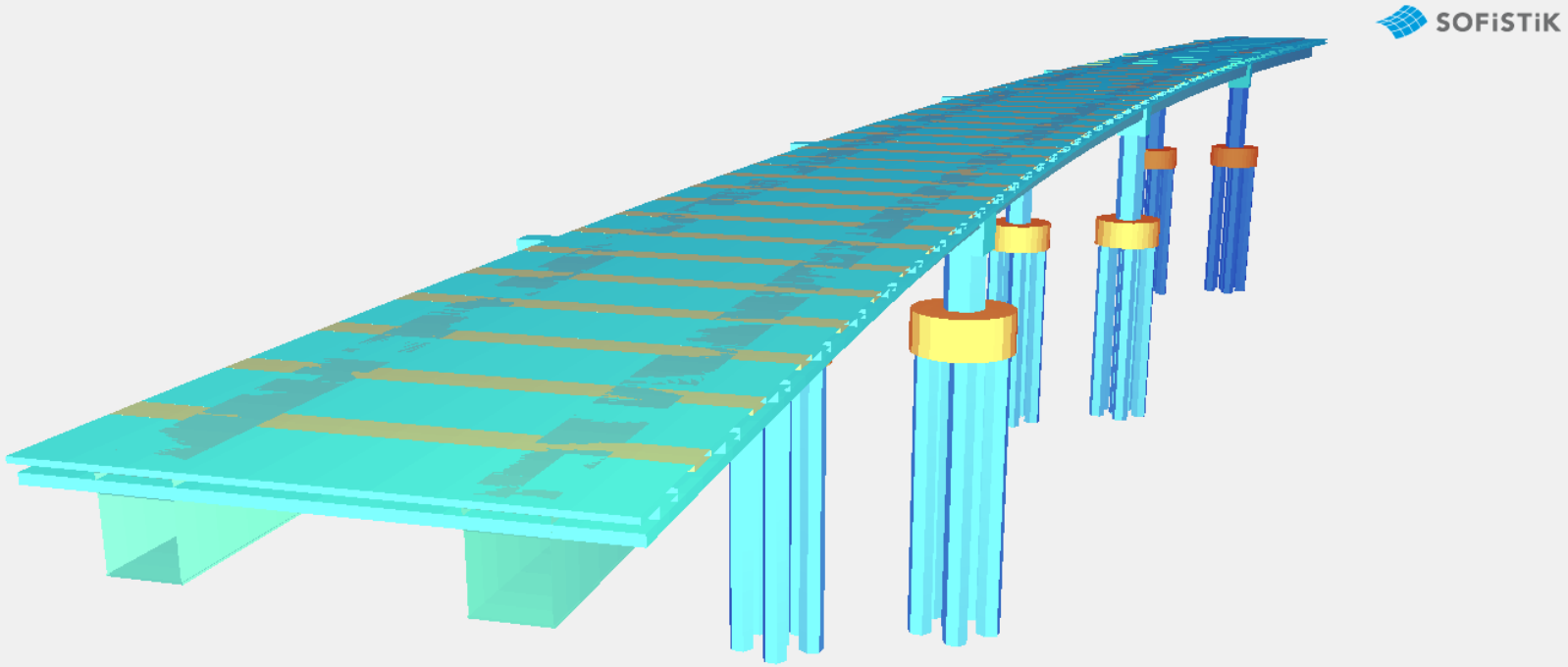
2. Mureș Bridge on the Sebeș-Turda Motorway, lot 2, at km 40+200





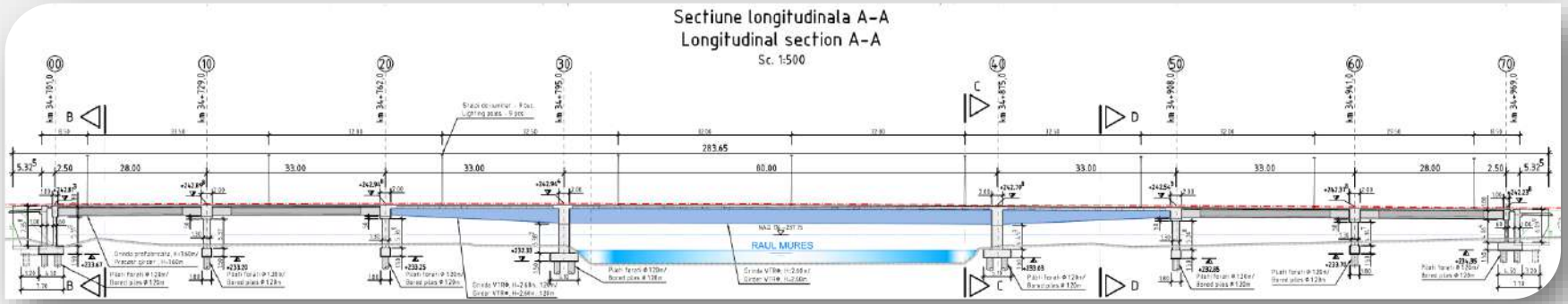
Ongoing projects

2. Mureș Bridge on the Sebeș-Turda Motorway, lot 2, at km 40+200
Sofistik model



Ongoing projects

3. Combined solutions for Mureș Bridge at km 34+750 on the Sebeș-Turda Motorway, lot 2
L = 268 m (28 + 33 + 33 +80 + 33 +33 + 28 m)



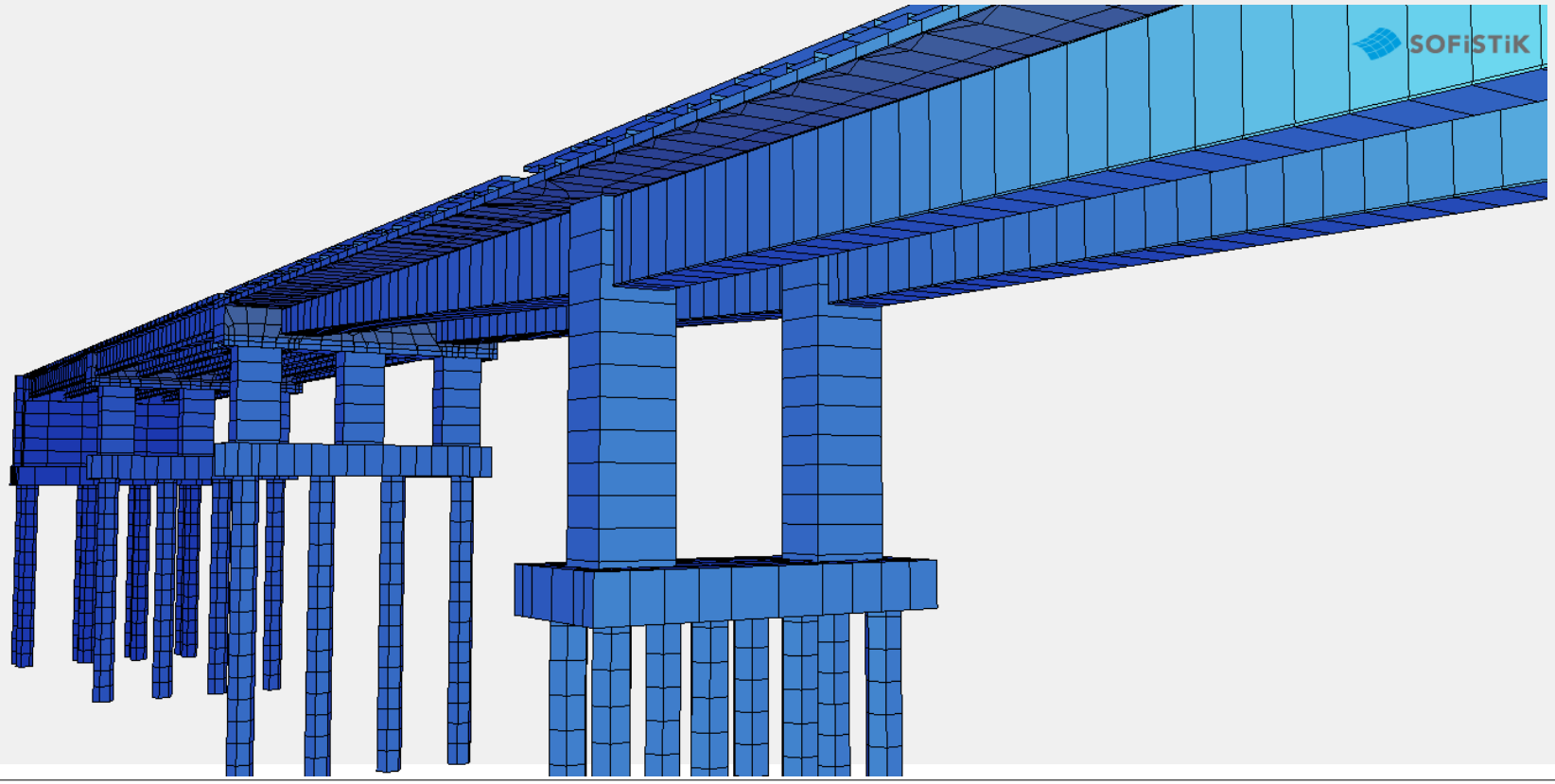
Prestressed concrete girders

VTR Composite structure

Prestressed concrete girders

Ongoing projects

3. Combined solutions for Mureș Bridge at km 34+750 on the Sebeș-Turda Motorway, lot 2



VTR® bridges in Romania

Deva Bypass over Mureș River;

Orăștie Viaduct over Railway and National Road.

Association:
SC STRABAG SRL & Partners

Sebeș-Turda Motorway, lot 2:

Skew Motorway Bridge over Railway at km 26+350.

Association:
AKTOR TECHNICAL SOCIETE ANONYME (AKTOR S.A.) &
S.C. EURO CONSTRUCT TRADING '98 S.R.L.

THANK YOU FOR YOUR ATTENTION!