MANDATAIRES DU PROJET POYA

GIPP : Groupe GVH par GVH Tramelan SA
Groupement d'**I**ngénieurs du **P**ont de la **P**oya
Projet GC du pont de la Poya (lot E)

MPP
Mandataires **P**rojet **P**oya
Projet des lots C, C1 et D
Direction des travaux des lots C, C1, D et E
Mandataires spécialisés des lots C, C1, D et E

Génie civil	:	Groupe GVH par GVH Tramelan SA Sous-traitant : BInC Groupe SD par sd ingénierie Fribourg SA Sous-traitant : Rhême et Jeanneret
Géologue	:	Bureau technique Norbert, géologues-conseils SA, Romont Sous-traitant : Gicot Géotechnique, Fribourg
Géomètre	:	Groupement GMPP par Reso SA, Bulle
Environnement	:	IC Infraconsult SA, Berne Sous-traitant : B+S AG, Berne
Electromécanique	:	Lombardi SA, Minusio Sous-traitant : SACAO, Givisiez
Architecte	:	BBA architectes sàrl, Fribourg

PONT DE LA POYA

PROJET GC: GVH

Chef de projet	:	B. Houriet
Chef de projet adjoint	:	P. Gorgé
Responsable géotechnique	:	A. Bisetti
Analyse structurale	:	S. Plumey

DLT: MPP

Directeur de chantier	:	J.-F. Gnaegi	GVH
Directeur de chantier adjoint	:	G. Baudin	BInC

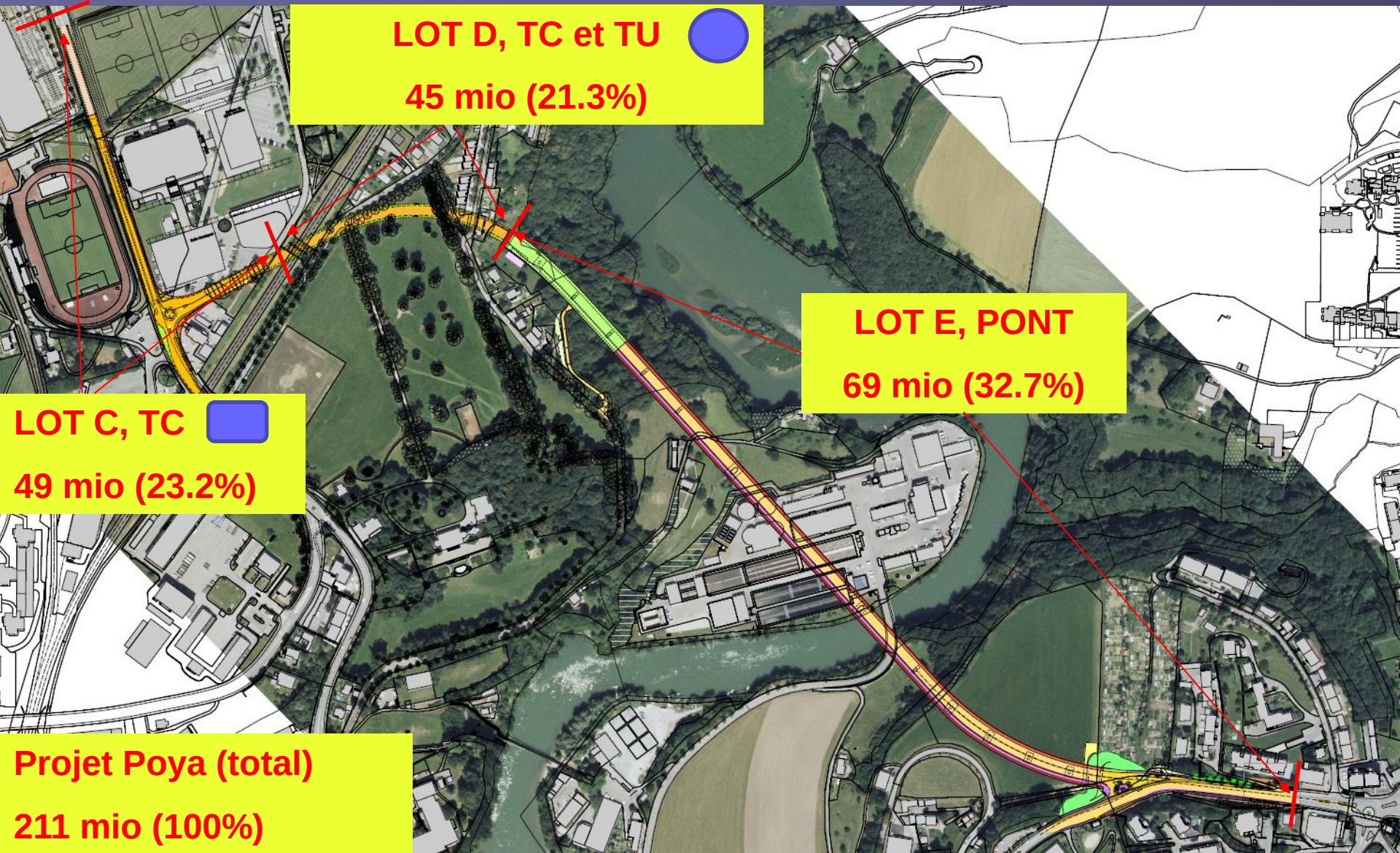
LOTS C ET D

PROJET: MPP

Chef de projet	:	B. Houriet	GVH
Chef de projet adjoint 1	:	A. Bisetti	GVH
Chef de projet adjoint 2	:	R. Joliat	SD
Analyse structurale	:	S. Plumey	GVH
Ingénieur de projet	:	J. Nicolet	SD

DLT: MPP

Directeur de chantier	:	J.-F. Gnaegi	GVH
Directeur de chantier adjoint (D)	:	G. Baudin	BInC
Directeur de chantier adjoint (C)	:	Y. Schorderet	SD


LOT D, TC et TU
45 mio (21.3%)
LOT E, PONT
69 mio (32.7%)
LOT C, TC
49 mio (23.2%)
Projet Poya (total)
211 mio (100%)

Lot D - TC CFF
Voûte et radier contrevoûté

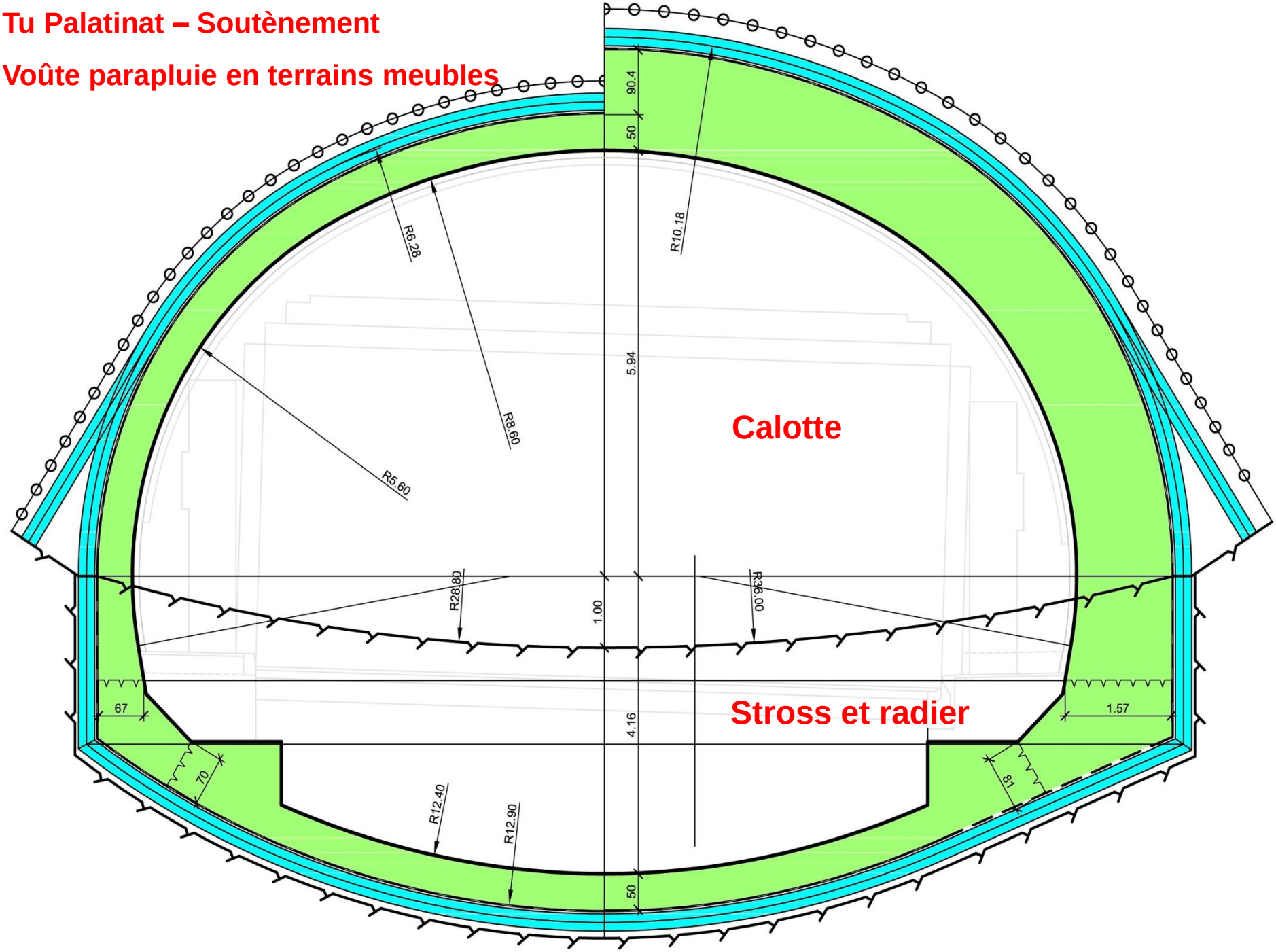

Armature
transversale :
cages préfabriquées
étriers fermés
avec crochets


Armature
longitudinale :
treillis


TU Palatinat
Lot D - TC Palatinat
Voûte et radier contrevoûté

Tu Palatinat – Soutènement

Voûte parapluie en terrains meubles



Lot D - TU Palatinat
Voûte et radier contrevoûté

Voûte:

épaisseur	0.50 m
armature transversale	ϕ 14 e = 15 cm
étriers	ϕ 10 e = 30 cm
armature longitudinale	ϕ 16 e = 15 cm


Frutiger
INFRA TUNNEL
Implenia
Lot D – TU Palatinat 80m
Lot E – Fouille Palatinat

30.03.2016

Projet Poya

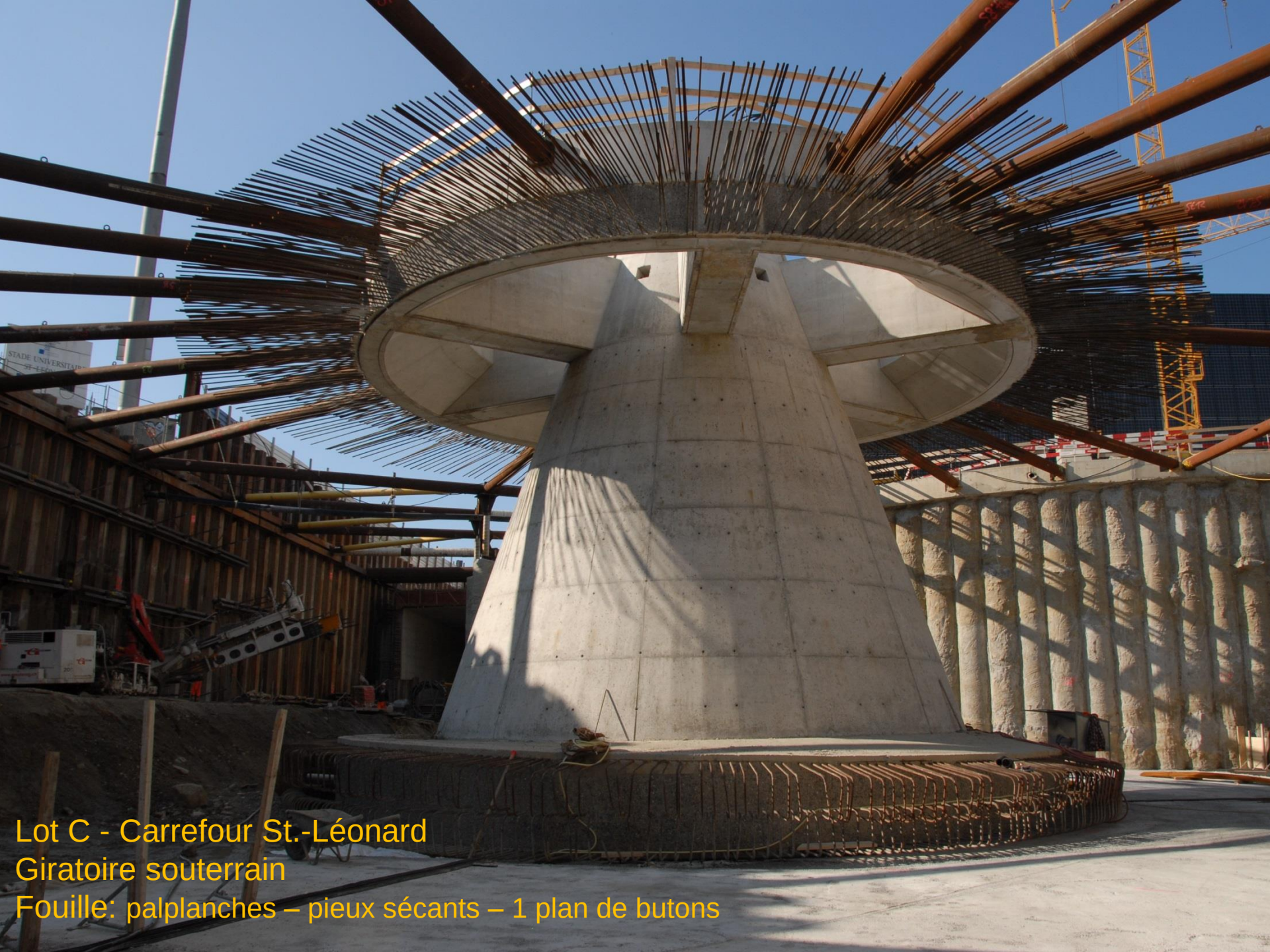
Lot E: Pont et fouille Palatinat

Lot C - TC
du Stade

Section
rectangulaire

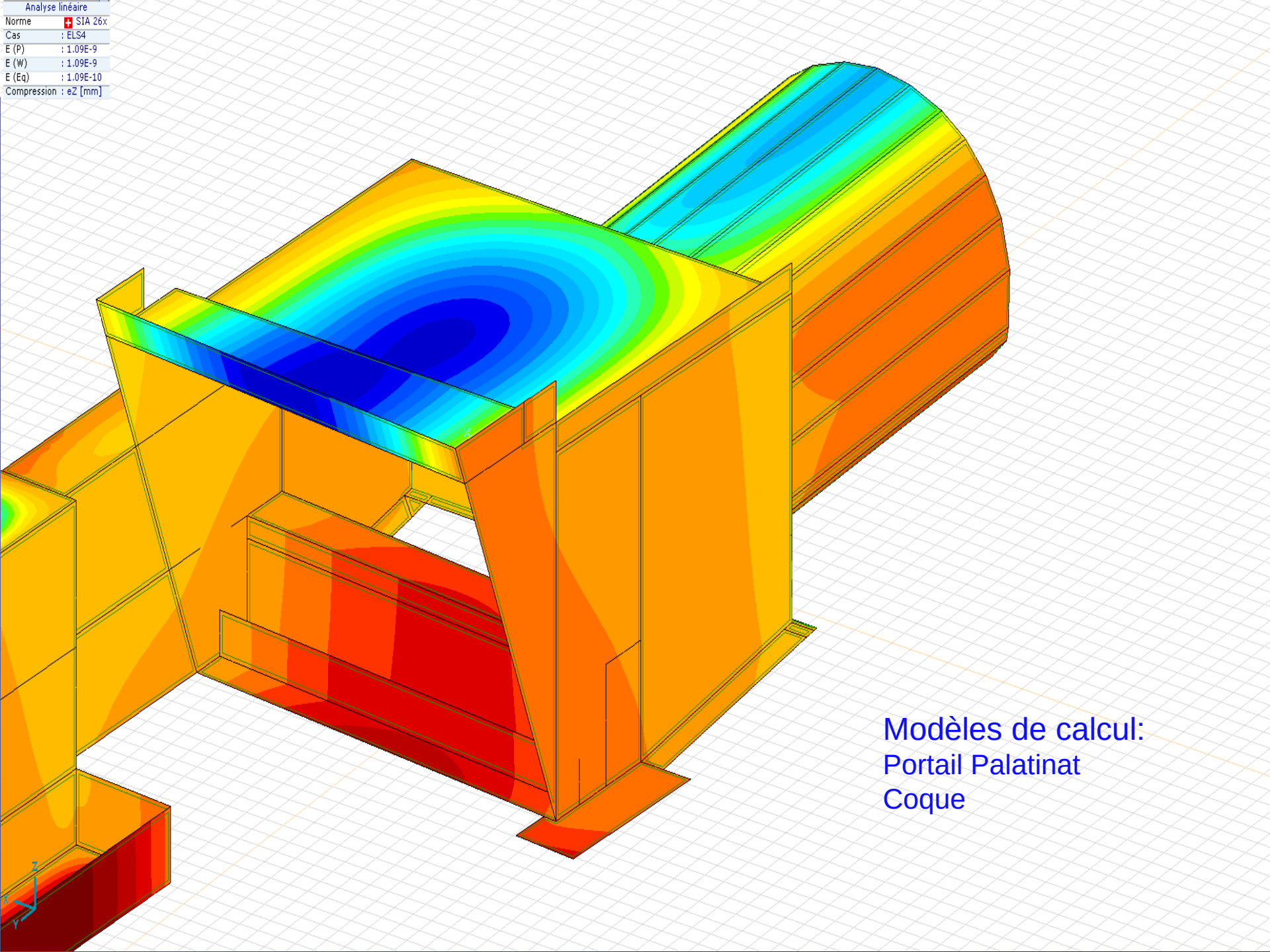
Fouille:
palplanches
2 niveaux de butons

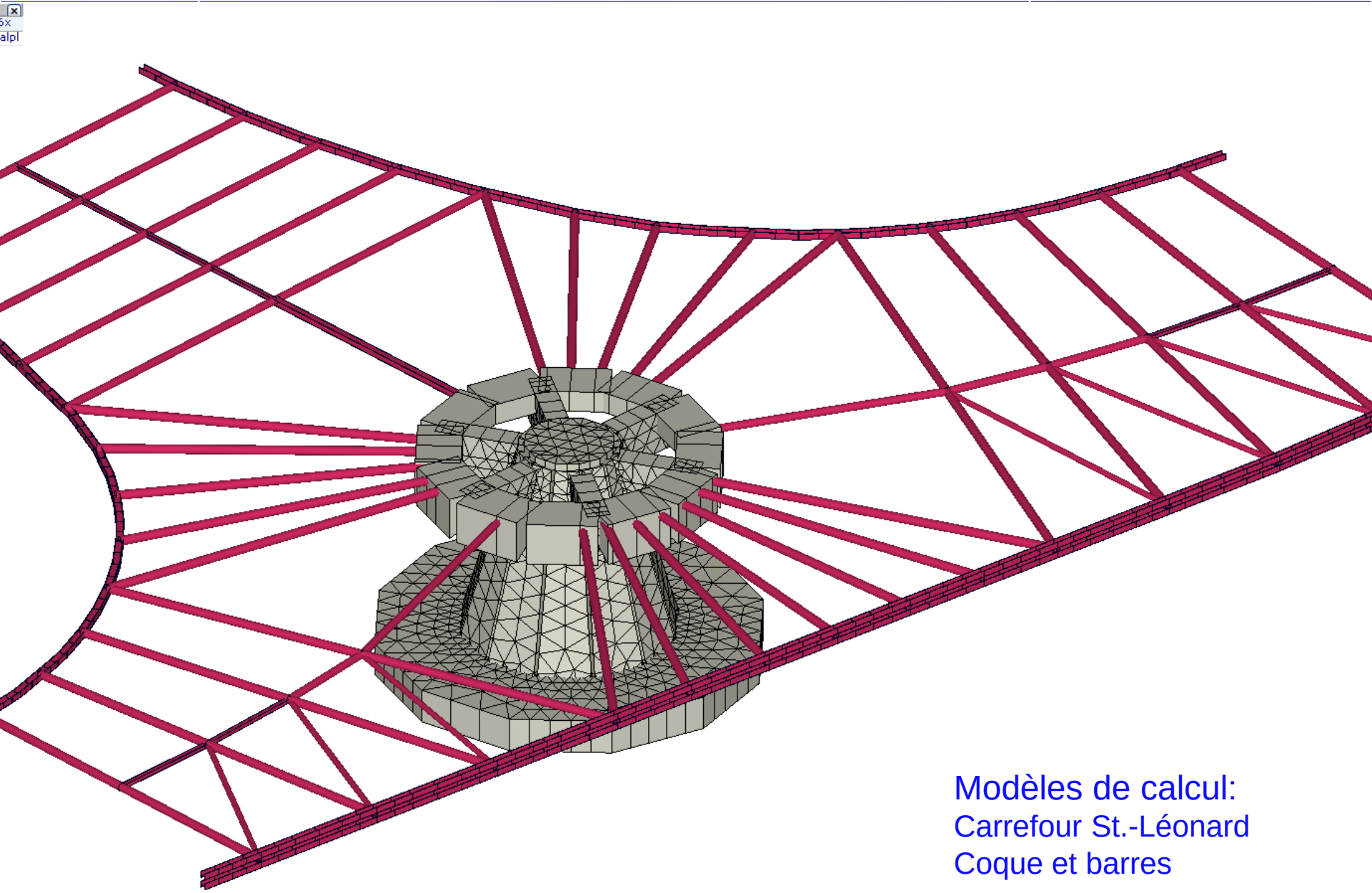

Interface lot D
Lot C - TC
St.-Léonard
Section
rectangulaire
Fouille:
palplanches
butons
tirants actifs
924
COMPACT
LIEBHERR



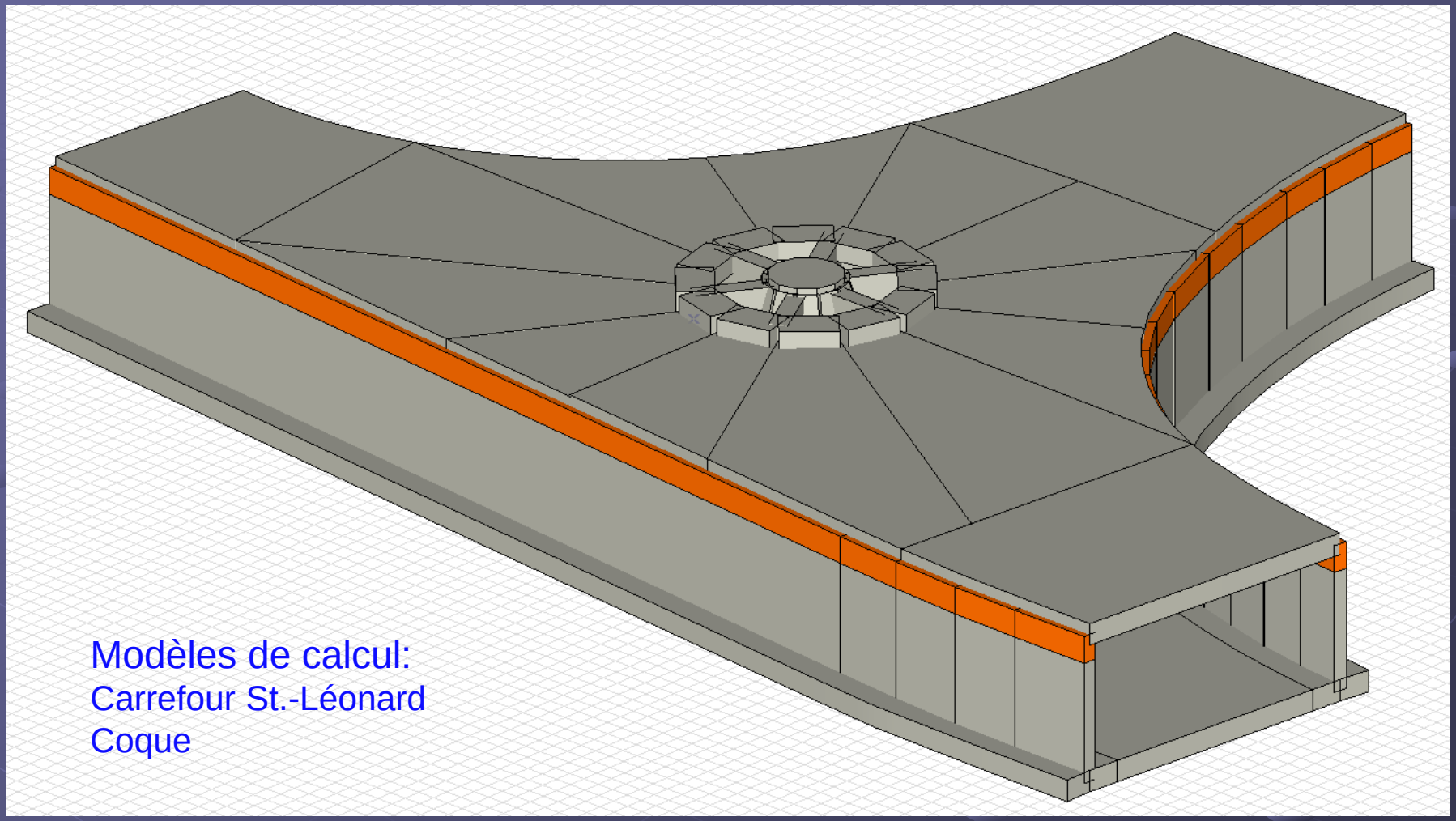
Lot C - Carrefour St.-Léonard
Giratoire souterrain
Fouille: palplanches – pieux sécants – 1 plan de butons

groupe


Analyse linéaire
Norme SIA 26x
Cas : ELS4
E (P) : 1.09E-9
E (W) : 1.09E-9
E (Eq) : 1.09E-10
Compression : eZ [mm]
Modèles de calcul:
Portail Palatinat
Coque

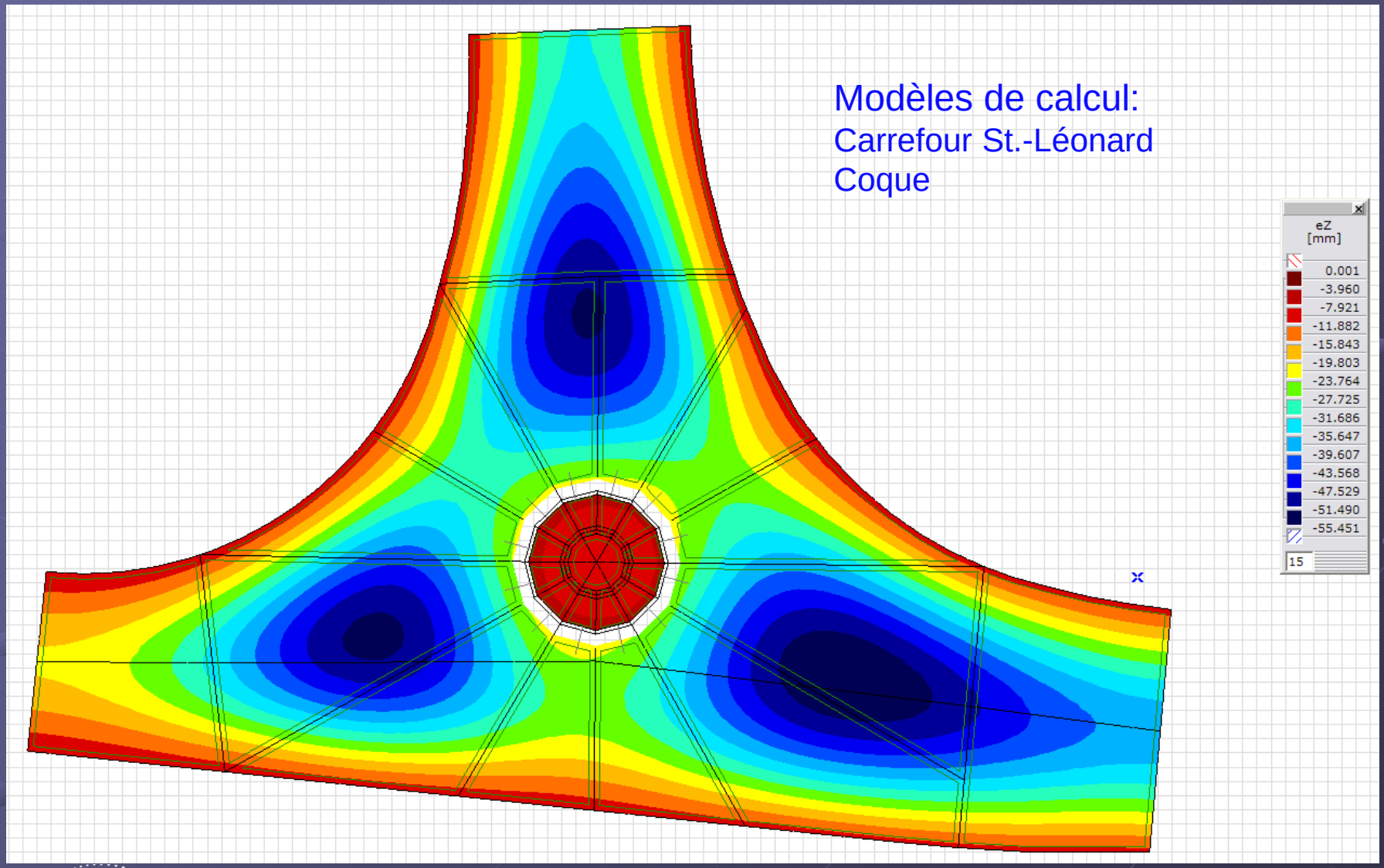


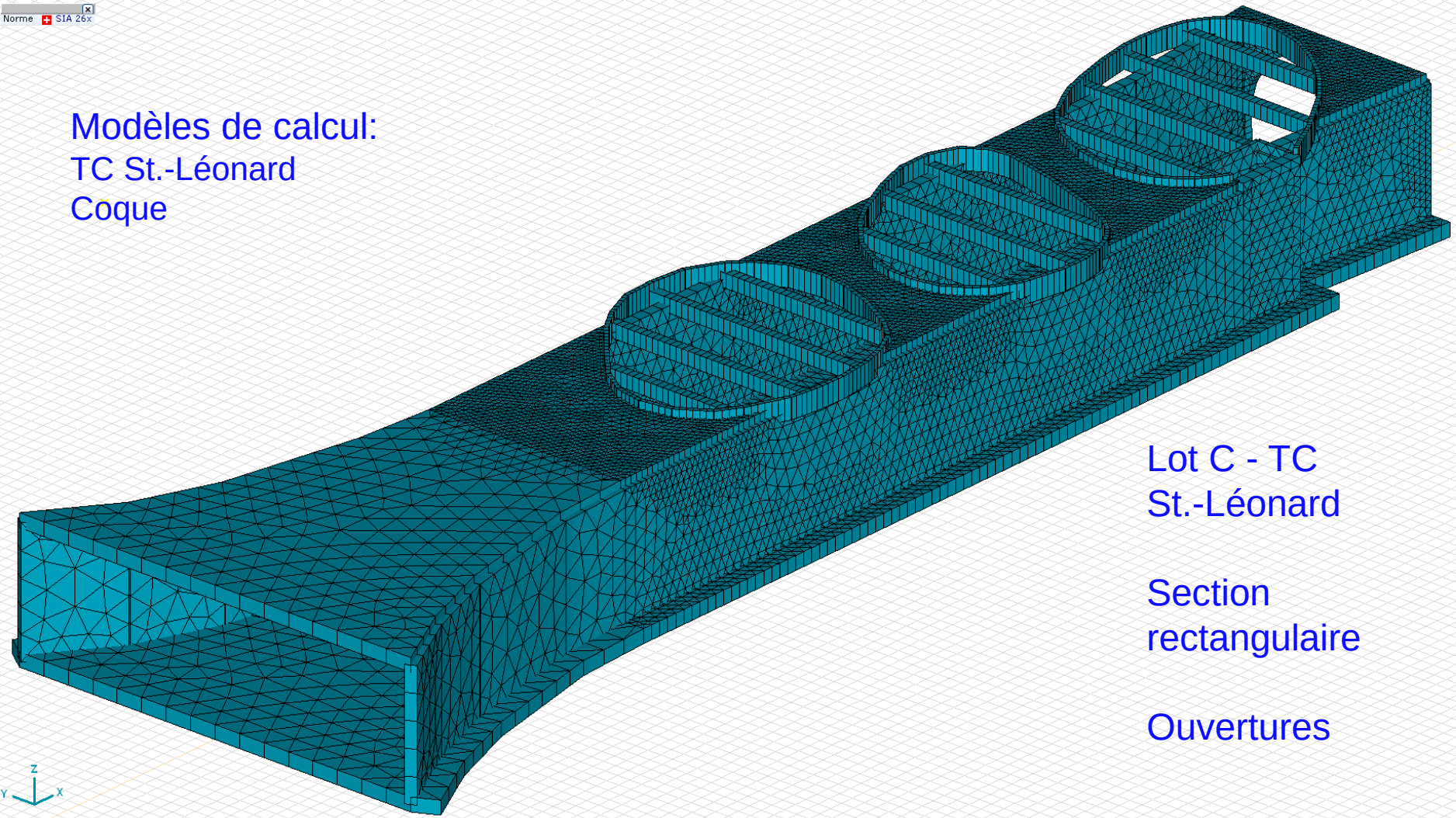
Modèles de calcul:
Carrefour St.-Léonard
Coque et barres



Modèles de calcul:
Carrefour St.-Léonard
Coque

Modèles de calcul:
Carrefour St.-Léonard
Coque





Modèles de calcul:

TC St.-Léonard

Coque

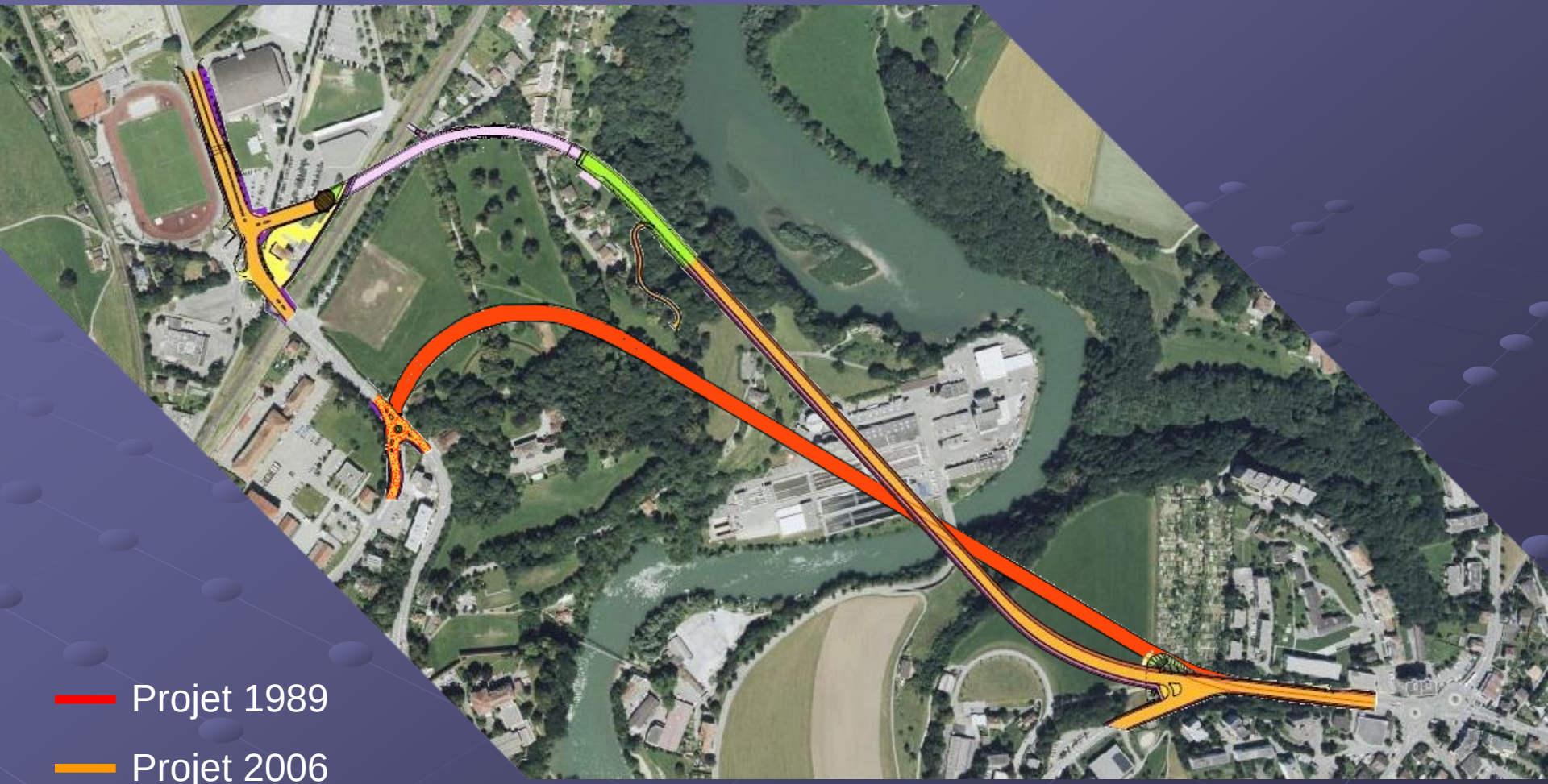
Lot C - TC St.-Léonard

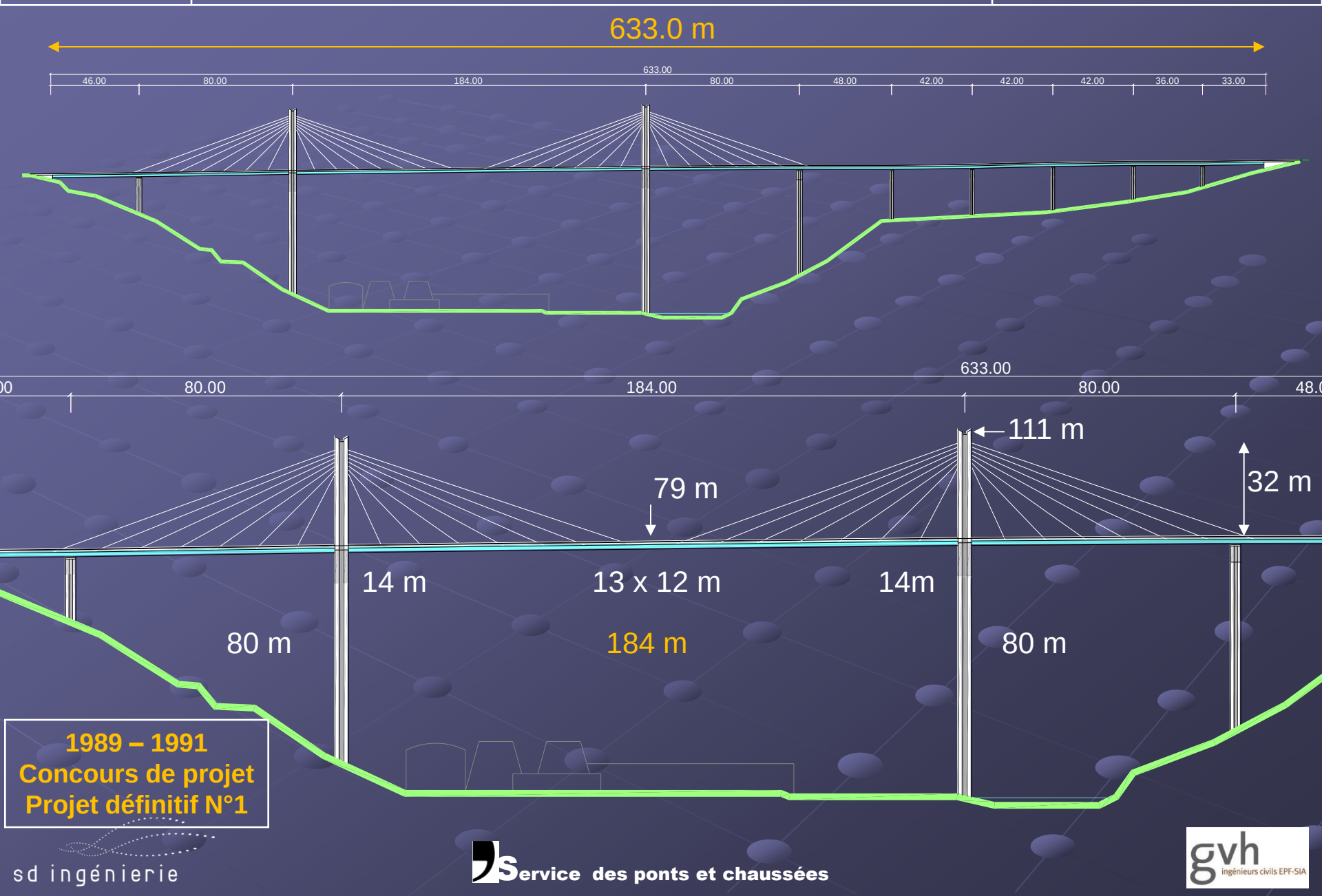
Section rectangulaire

Ouvertures

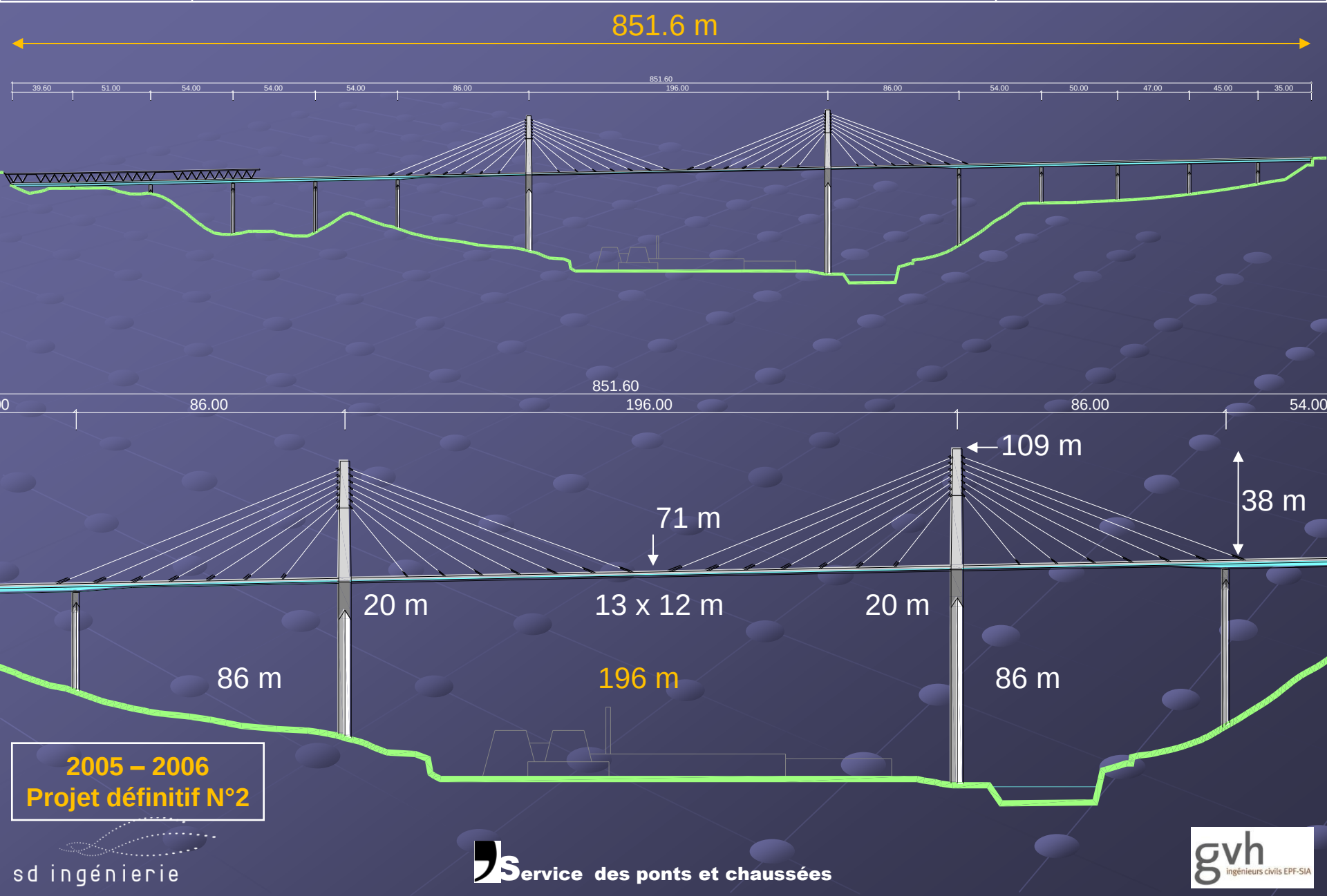
CONTENU DE LA PRESENTATION

1. Géométrie
2. Conception de l'ouvrage
3. Procédé de montage
4. Analyse structurale


Projet 1989
Projet 2006



1989 – 1991
Concours de projet
Projet définitif N°1



2005 – 2006
Projet définitif N°2

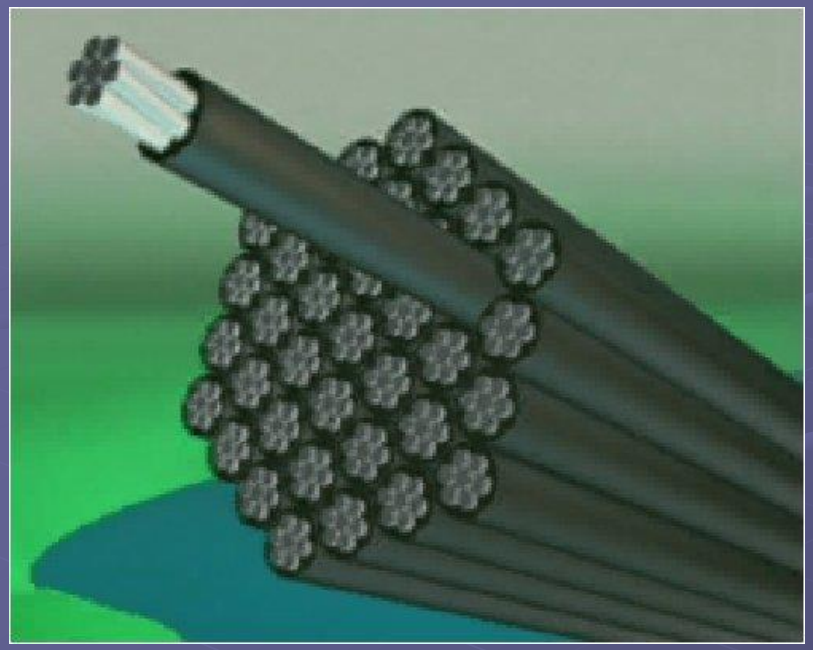
sd ingénierie

Service des ponts et chaussées

gvh ingénieurs civils EPF-SIA

CONCEPTION DE L'OUVRAGE

1. Haubans
2. Tablier
3. Mâts
4. Fondations

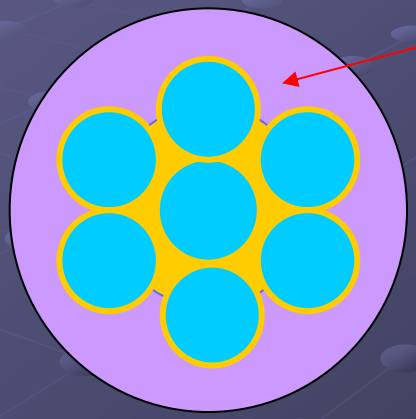


Faisceau de torons

Toron

MONTAGE ET DEMONTAGE

PROTECTION CONTRE LA CORROSION DES TORONS



Gaine de protection individuelle

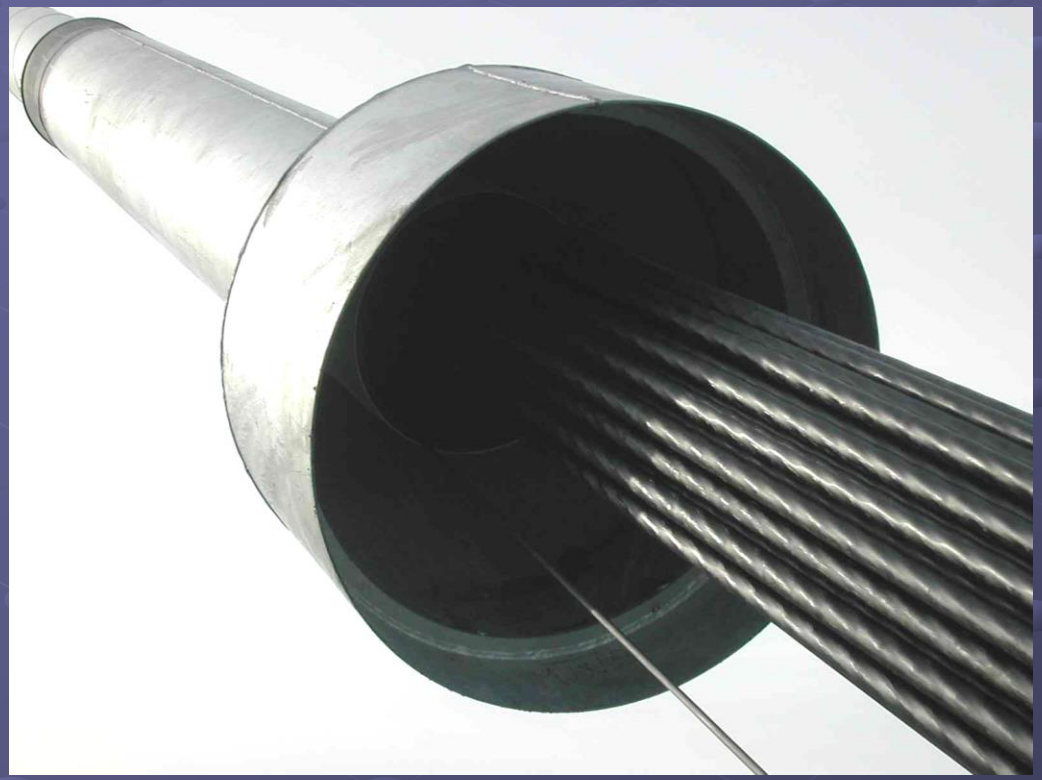
Protection interne contre la corrosion des torons en 3 barrières

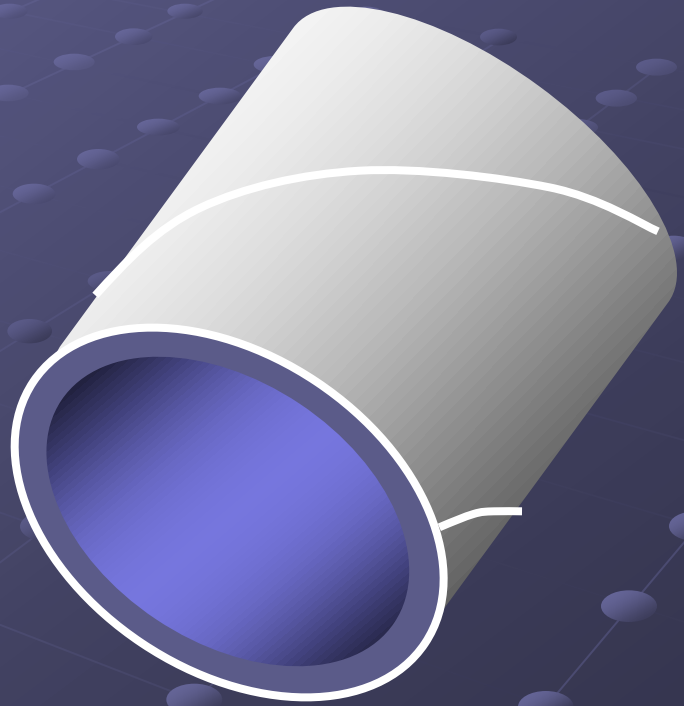
Polyéthylène haute densité

Cire

7 fils galvanisés

PROTECTION EXTERNE DES TORONS - GAINES





Haubanage en parapluie

Pont Rion Anti-Rion

Pont Rion Anti-Rion

Séisme: 7
Pétroliers: 180 t à 16 nœuds
Vent: 250 km/h
Portée: 560 m

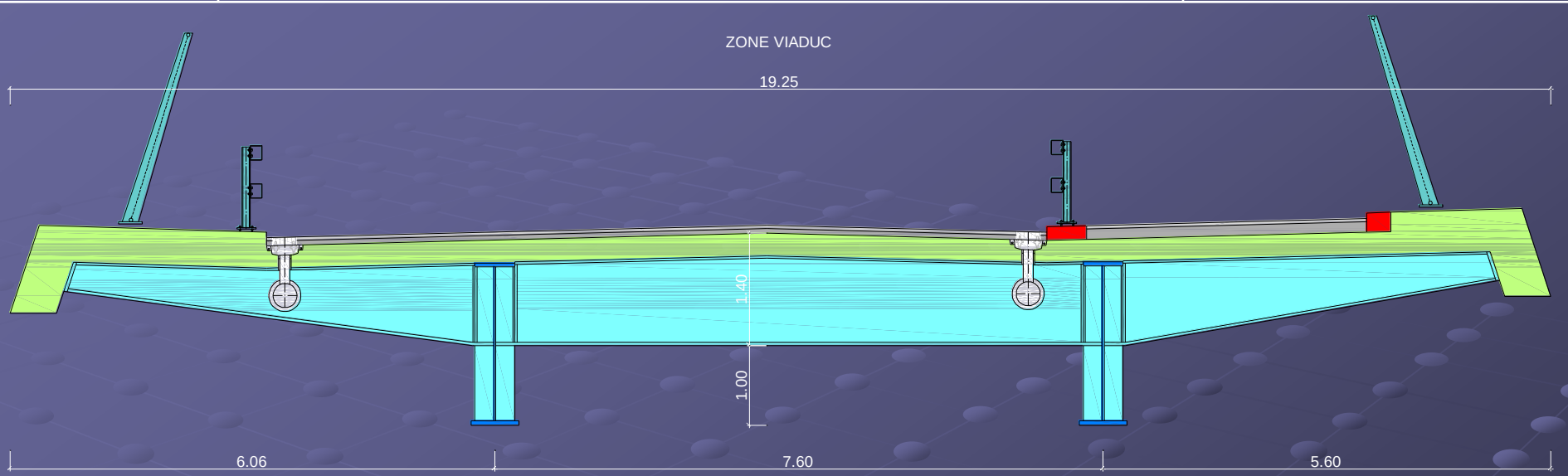
Pont Rion Anti-Rion


Hauteur des mâts: 215 m
Longueur totale: 2'141 m
Portée: 856 m
Pont de Normandie

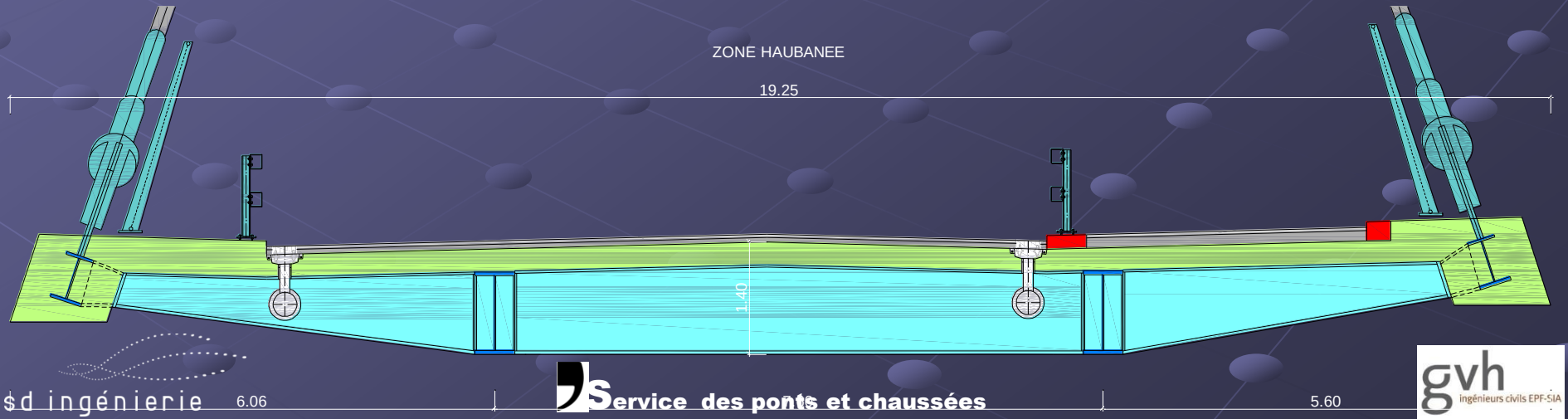

Hauteur du mât 2: 343 m
Hauteur du tablier: 254 m
Longueur totale: 2'460 m
Largeur: 32 m
Portées: 342 m


Viaduc de Millau

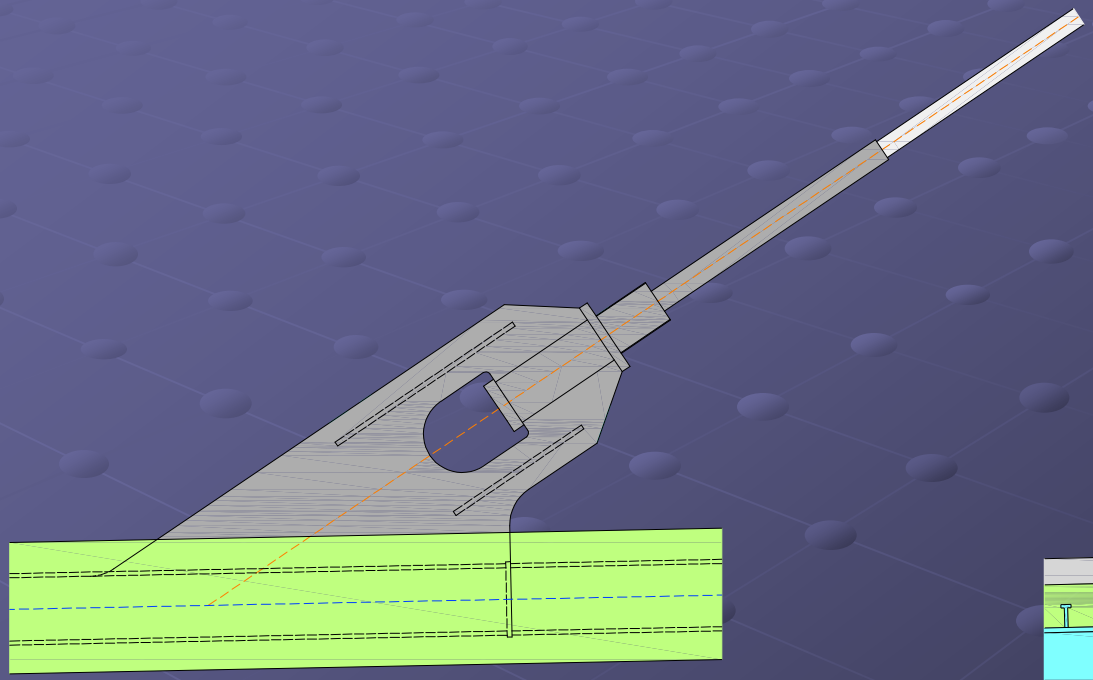
ZONE VIADUC

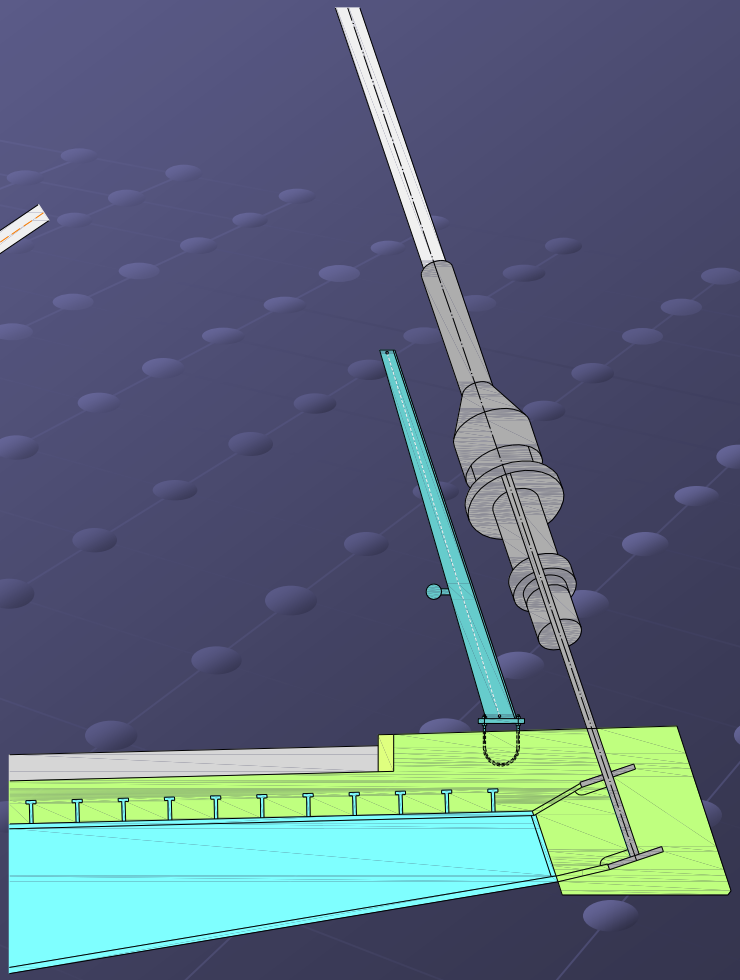


ZONE HAUBANEE

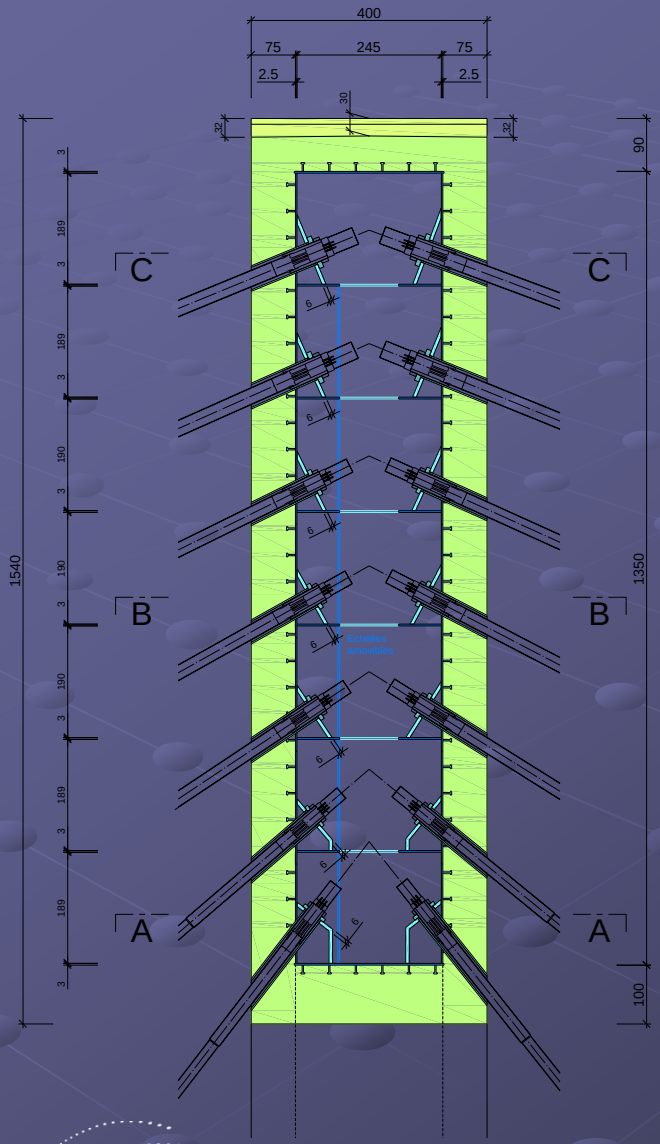


Ancrages fixes

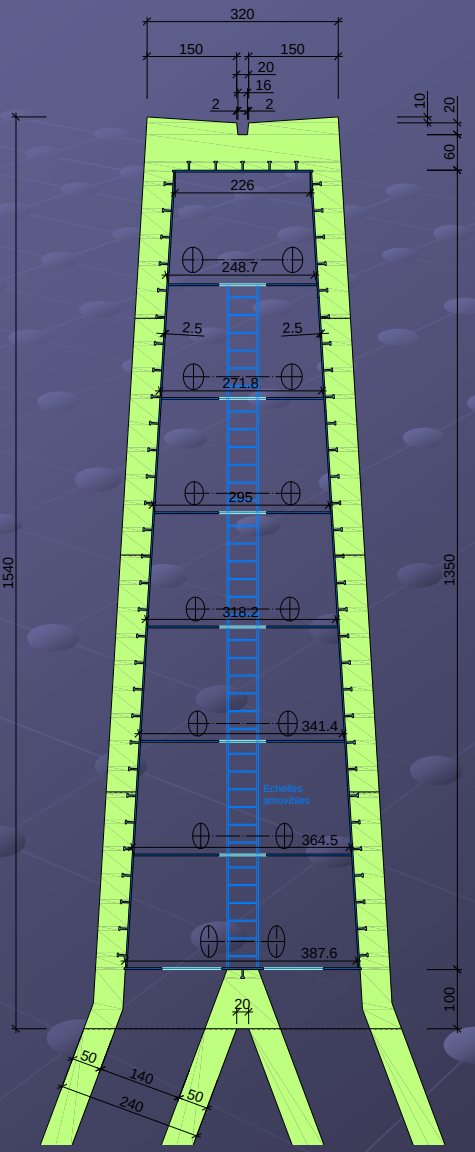




Coupe longitudinale 1:50



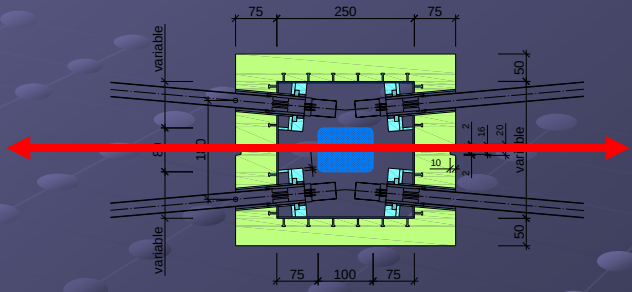
Coupe tranversale 1:50



Ancrages mobiles

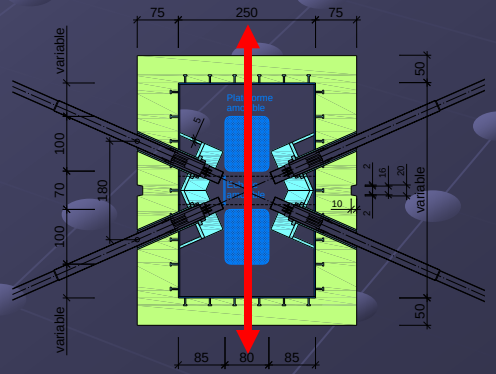
Coupe C - C 1:50

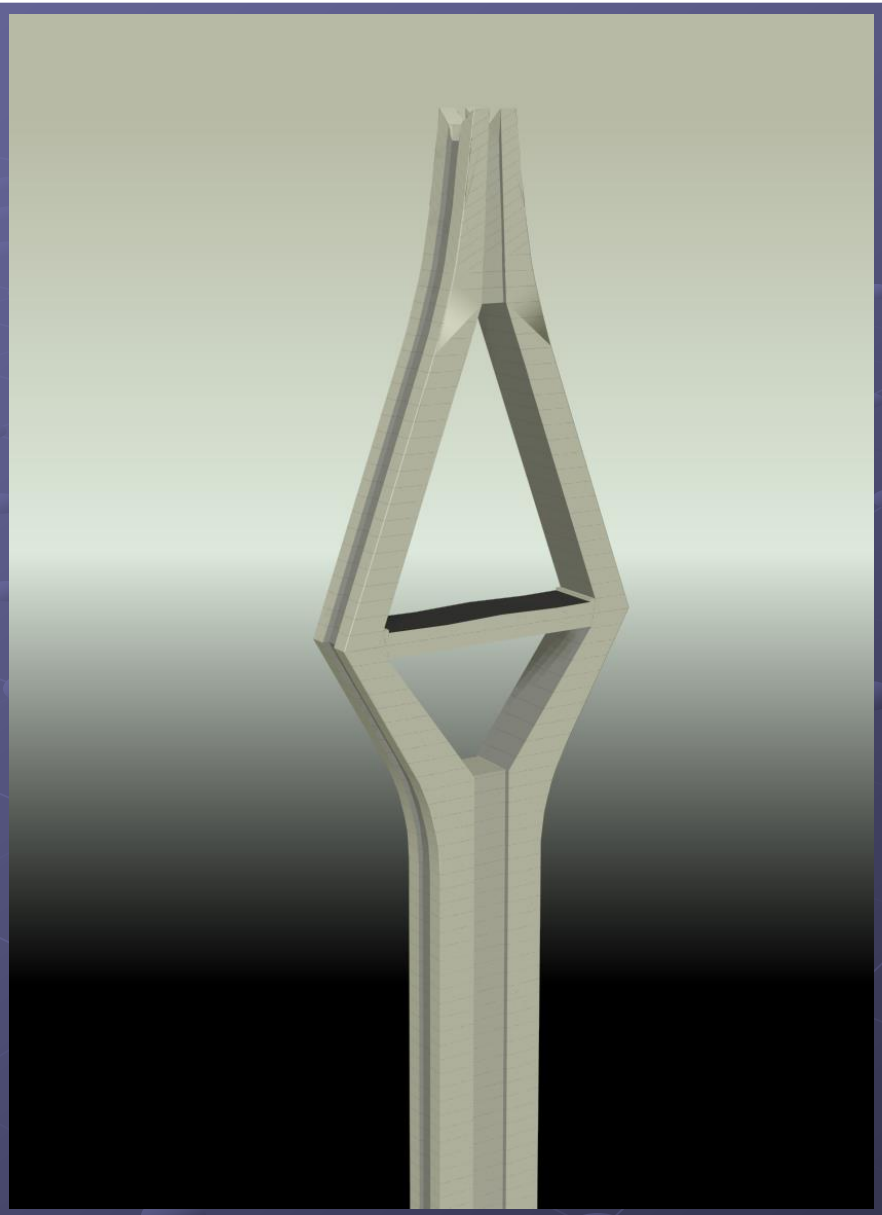
haubans supérieurs

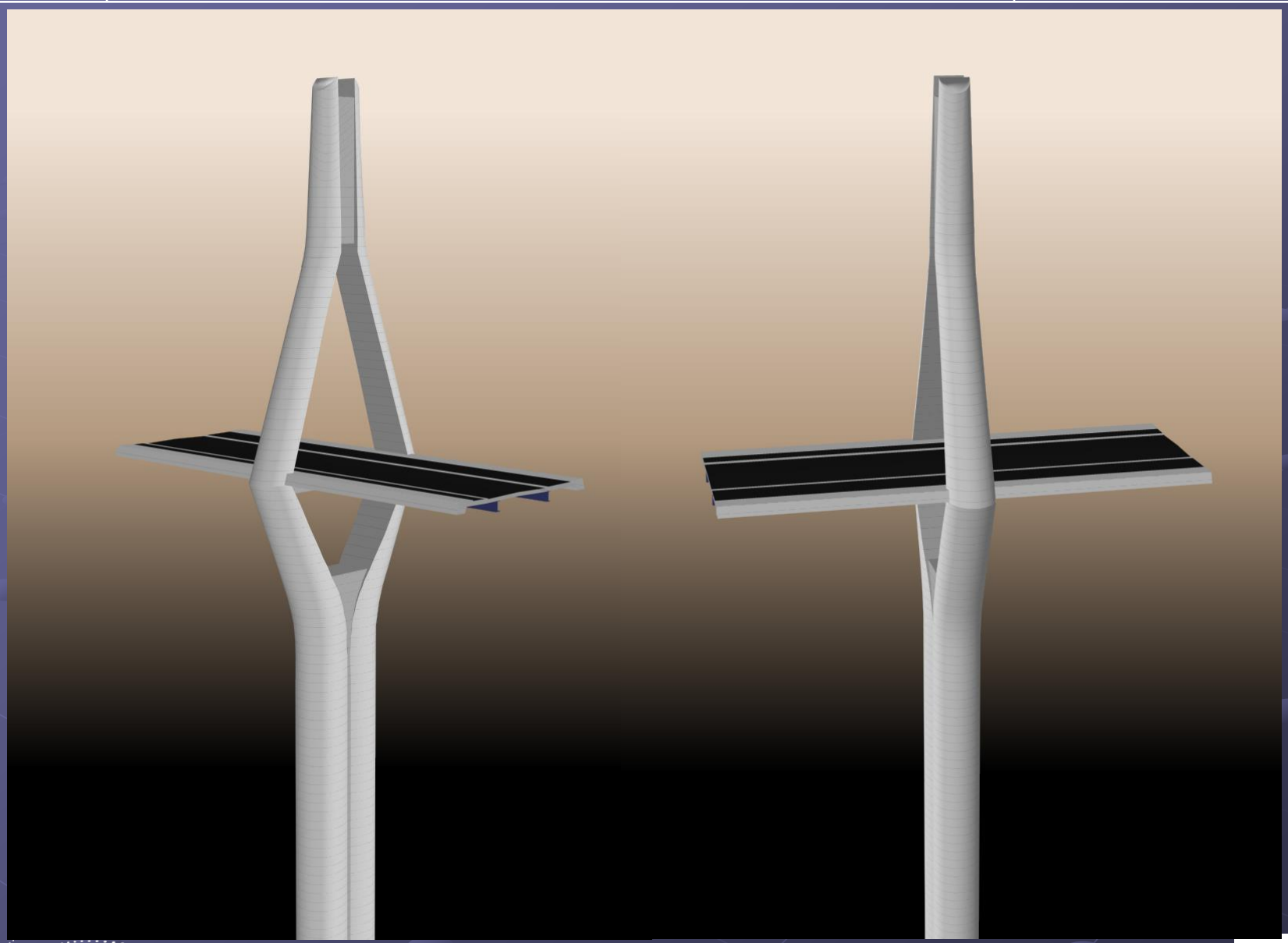


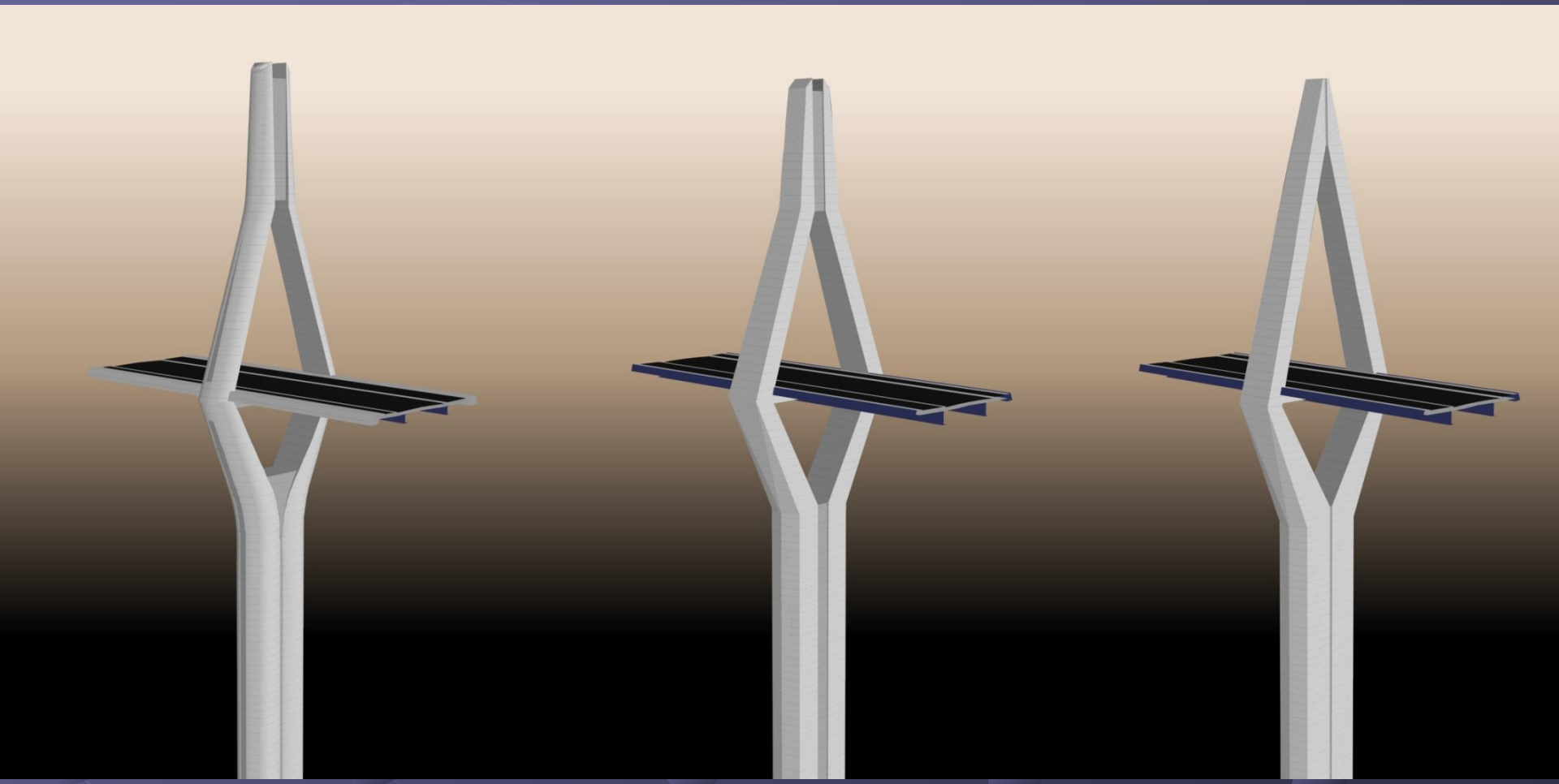
Coupe A - A 1:50

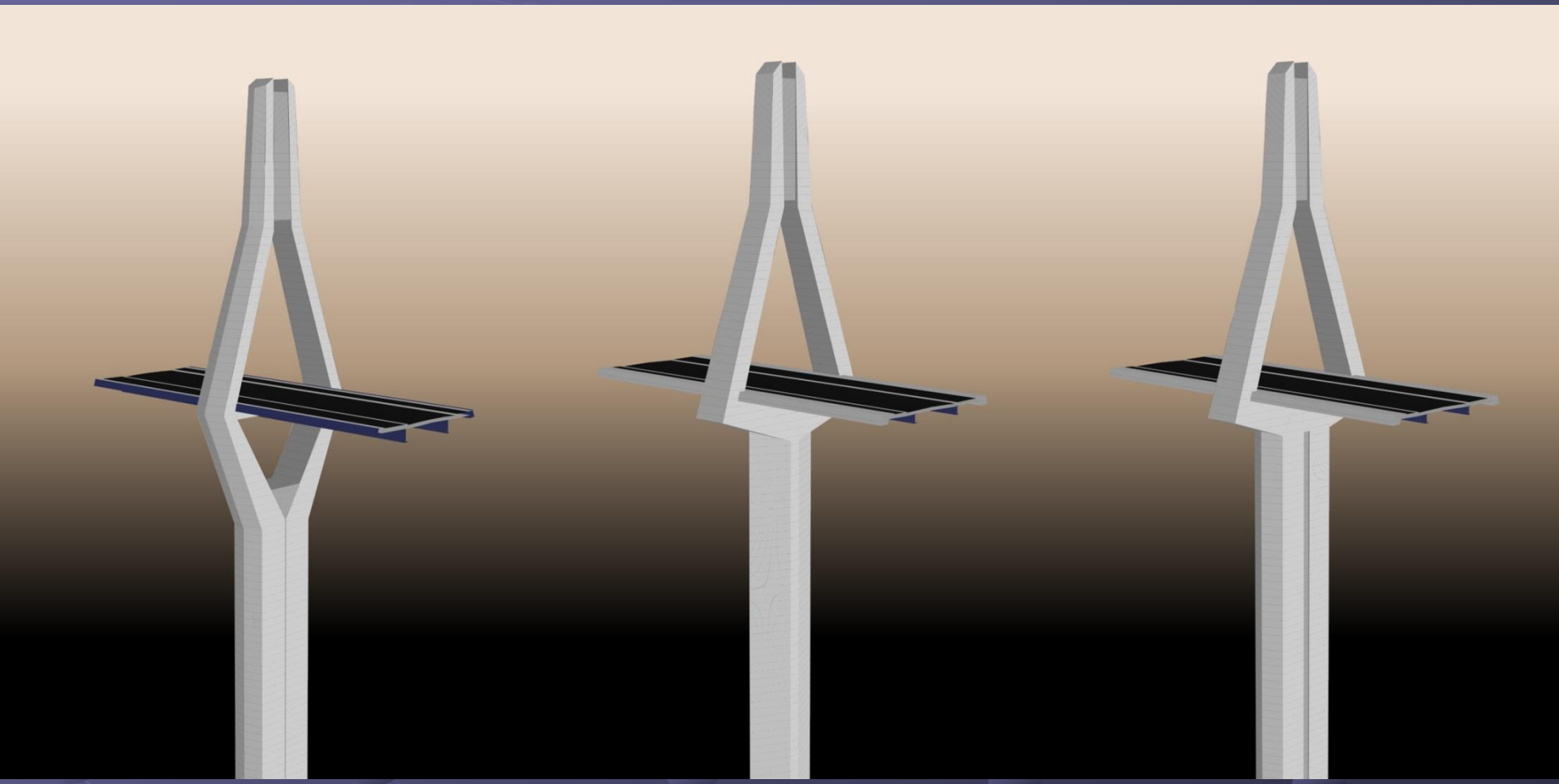
haubans inférieurs

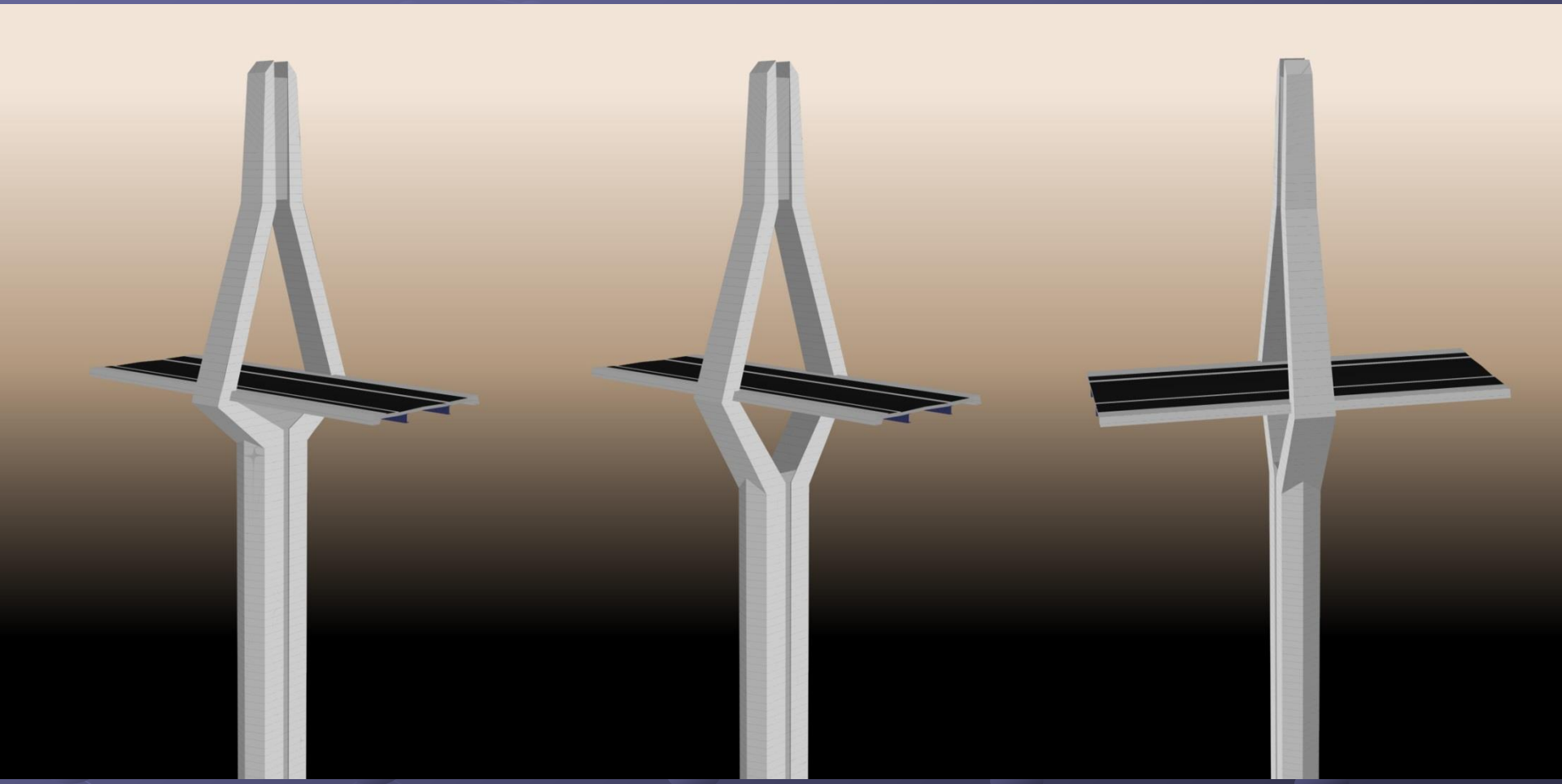




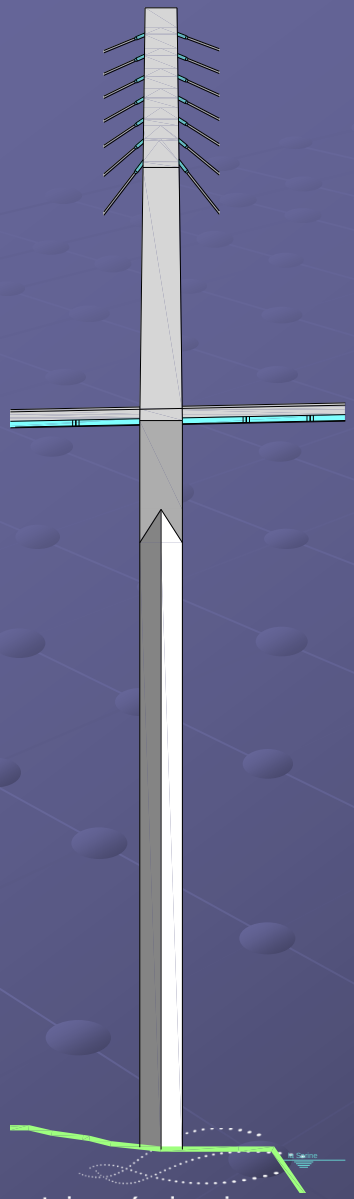




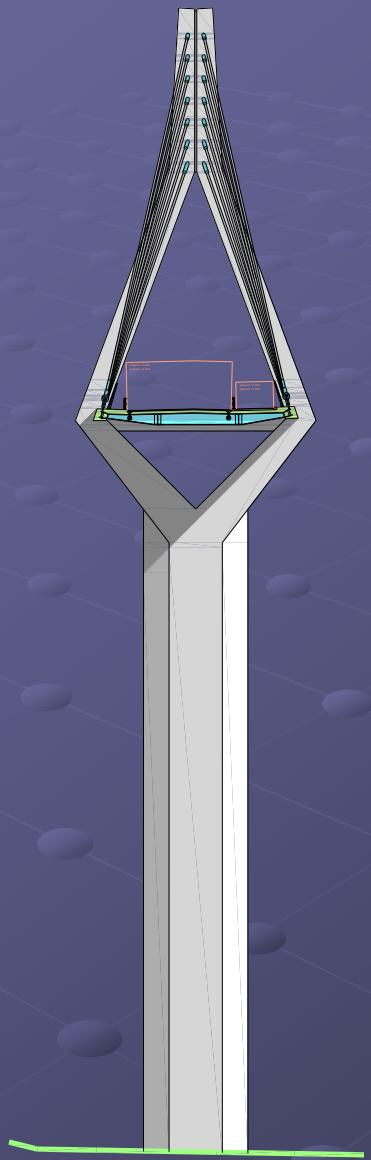




Elévation longitudinale

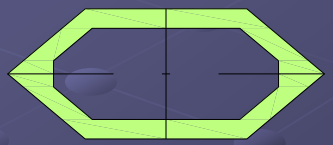


Elévation transversale

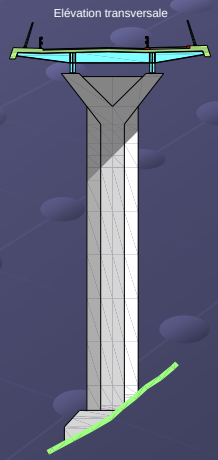


2005 – 2006
Projet définitif N°2

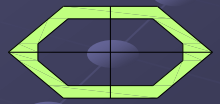
Coupe pied de mat



9.8m x 4m

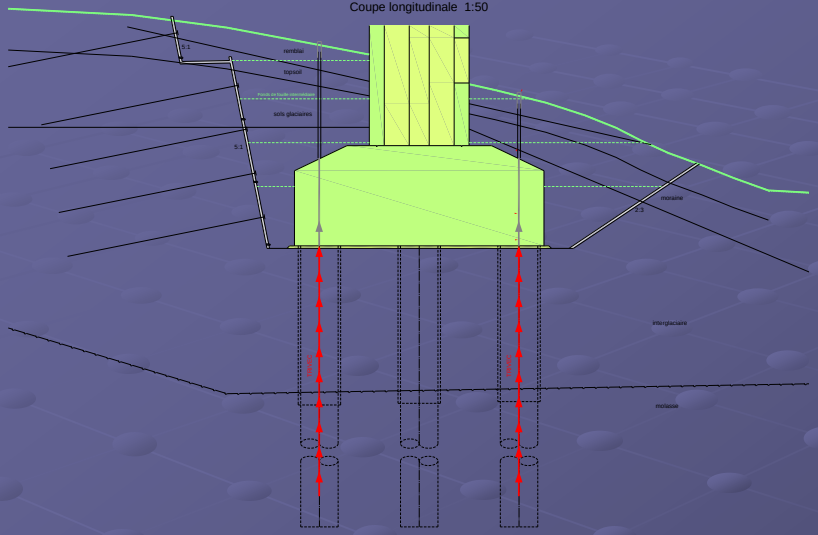


Coupe pied de pile

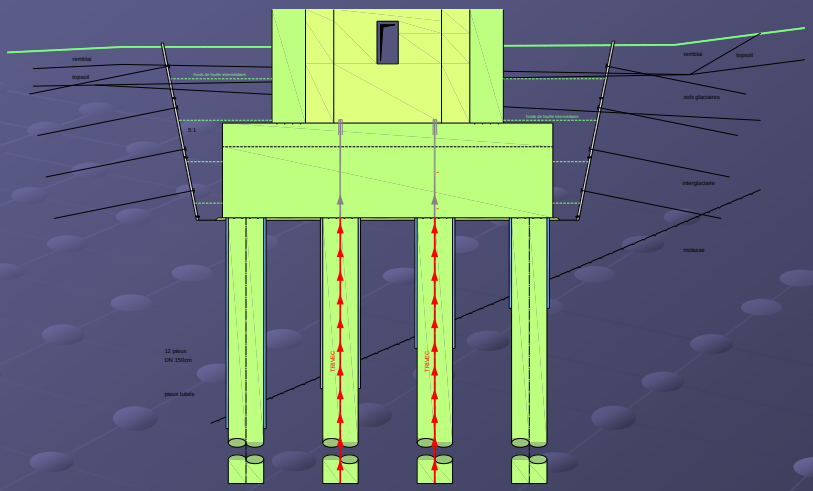


4.9m x 2.2m

Mat N° 6
Coupe longitudinale 1:50

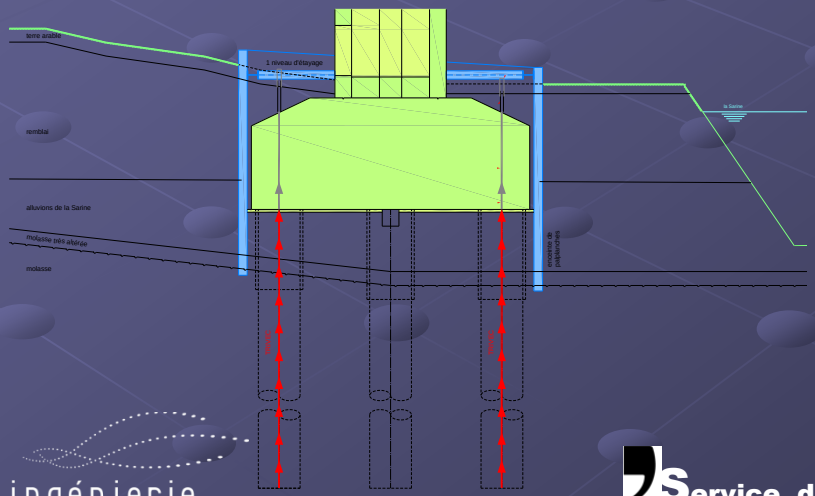


Mat N° 6
Coupe transversale 1:50

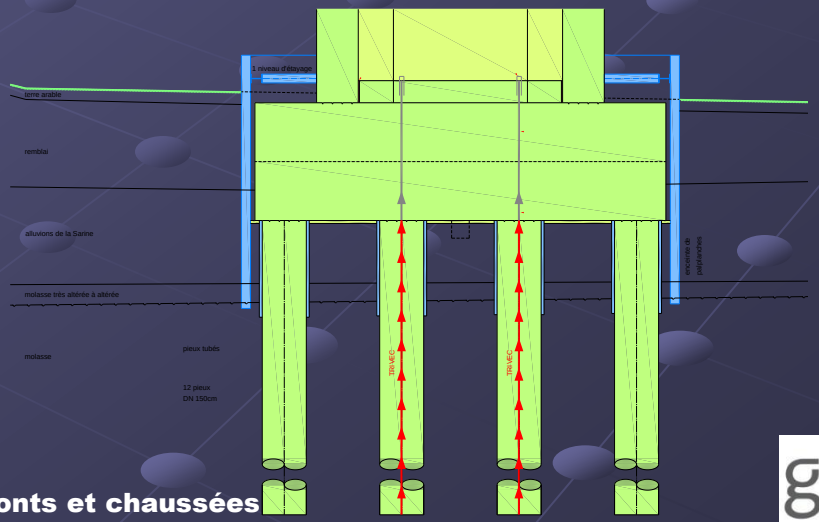


Mâts: 12 pieux DN 150

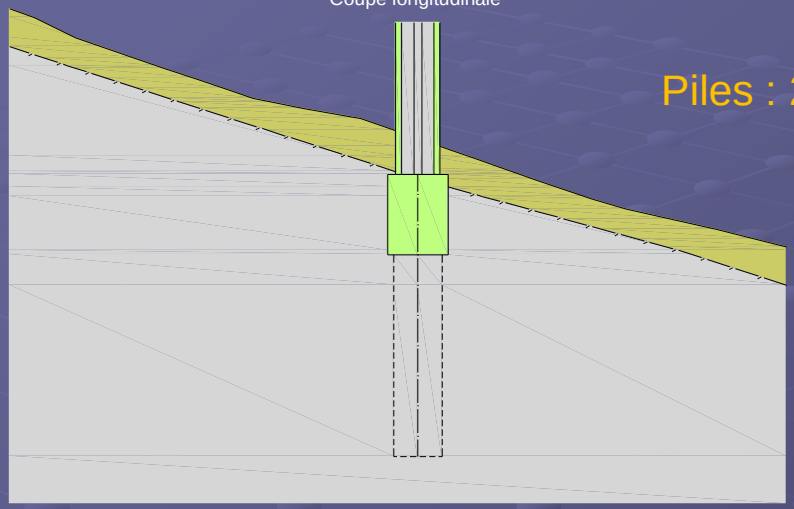
Mat N° 7
Coupe longitudinale 1:50



Mat N° 7
Coupe transversale 1:50

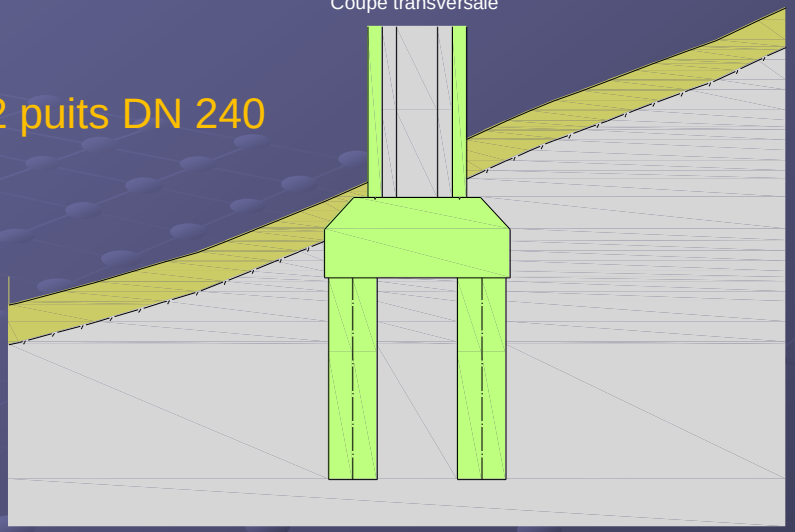


Pile N° 5
Coupe longitudinale

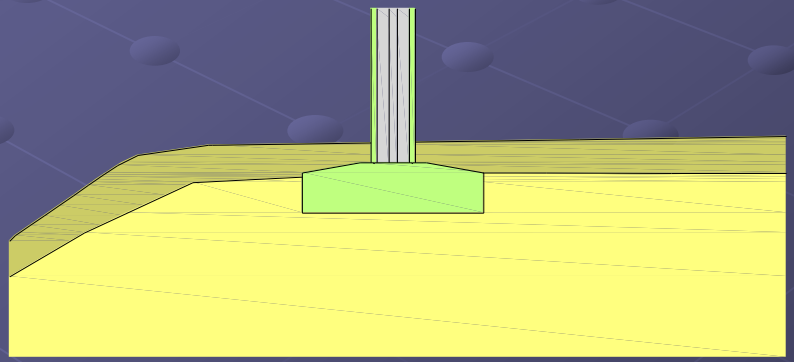


Piles : 2 puits DN 240

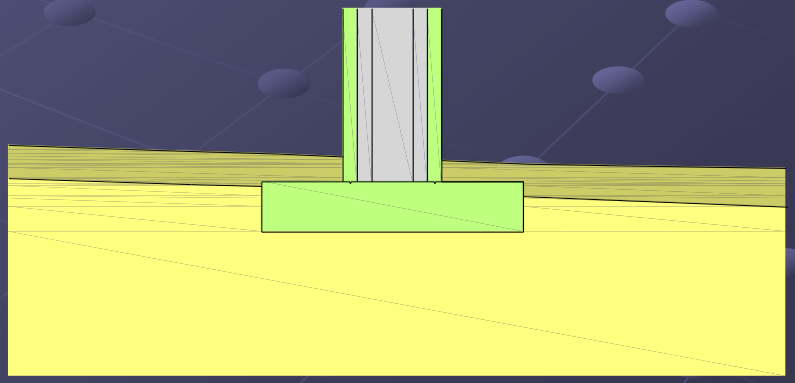
Pile N° 5
Coupe transversale



Pile N° 9
Coupe longitudinale

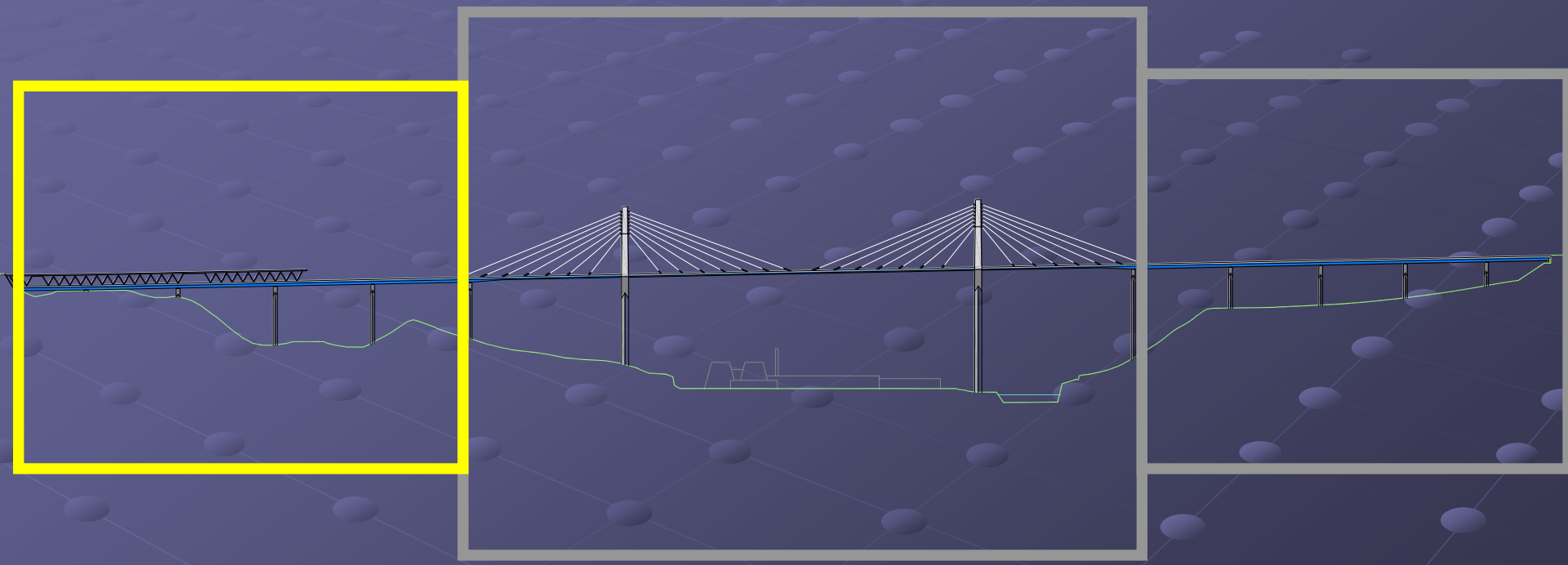


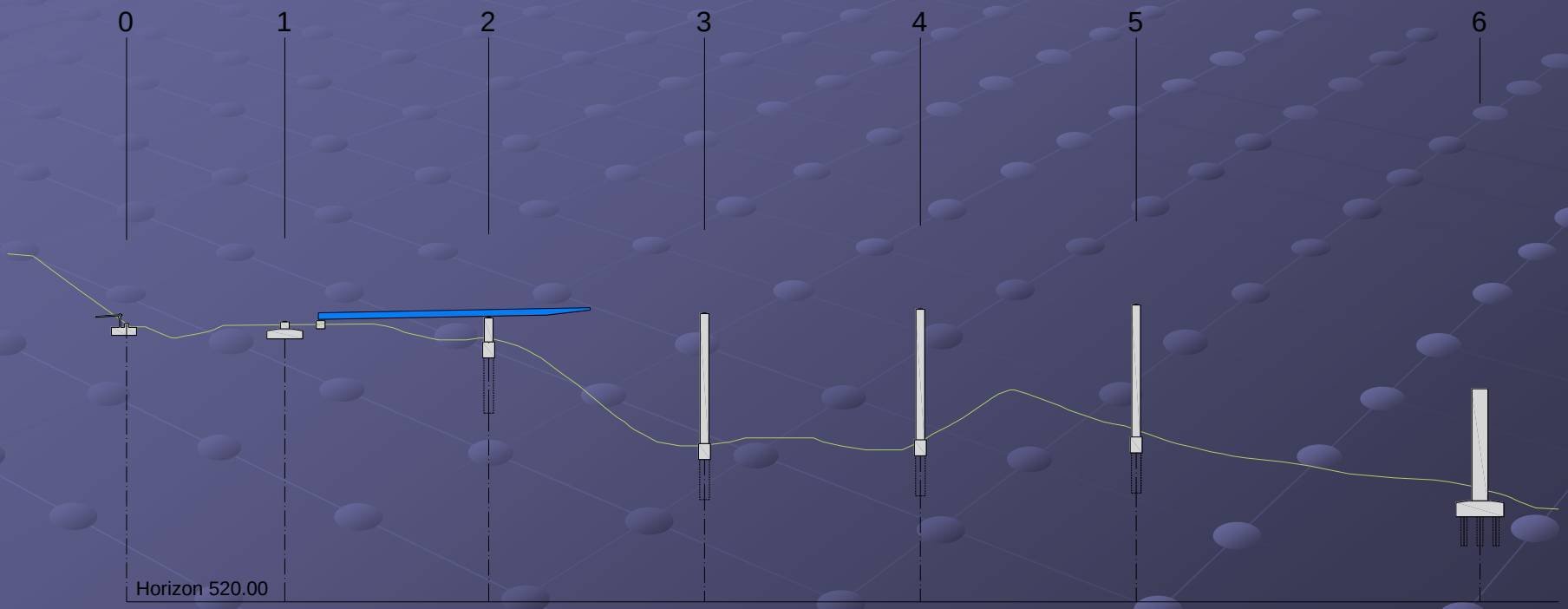
Pile N° 9
Coupe transversale

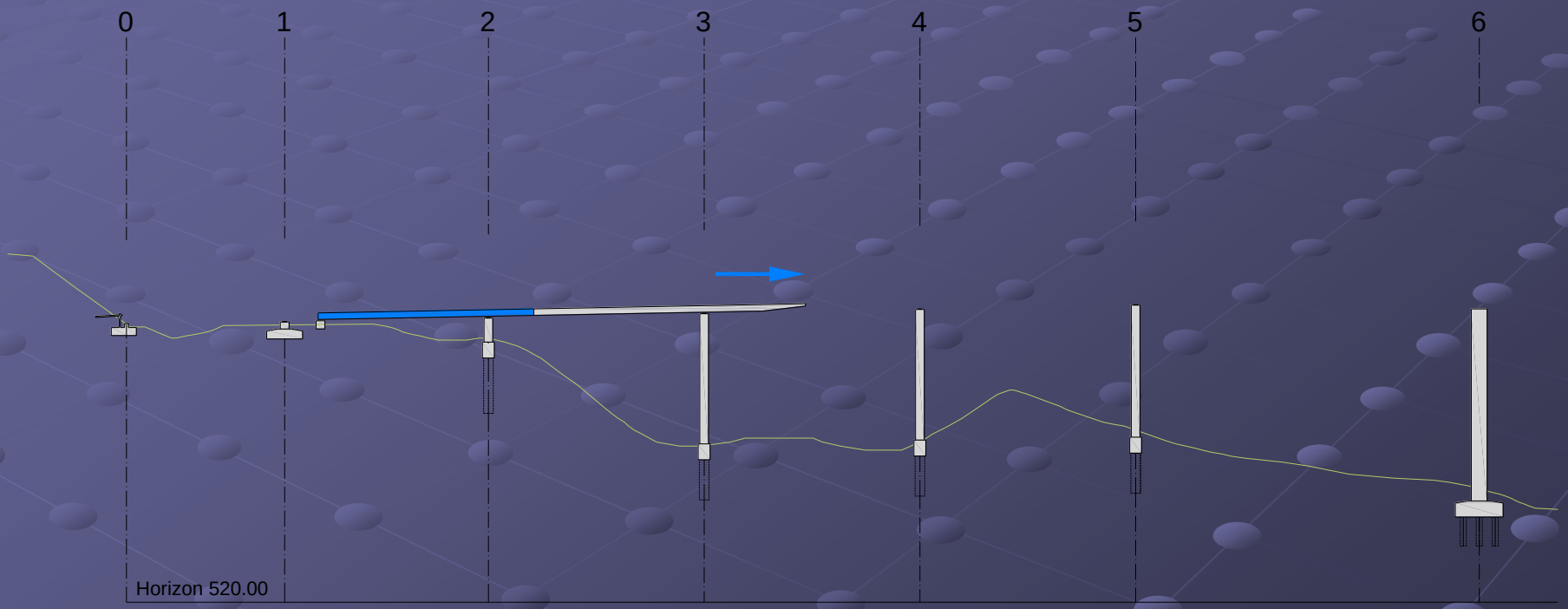


PROCEDE DE MONTAGE

Viaduc d'accès côté Palatinat




0
1
2
3
4
5
6
Horizon 520.00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1
2
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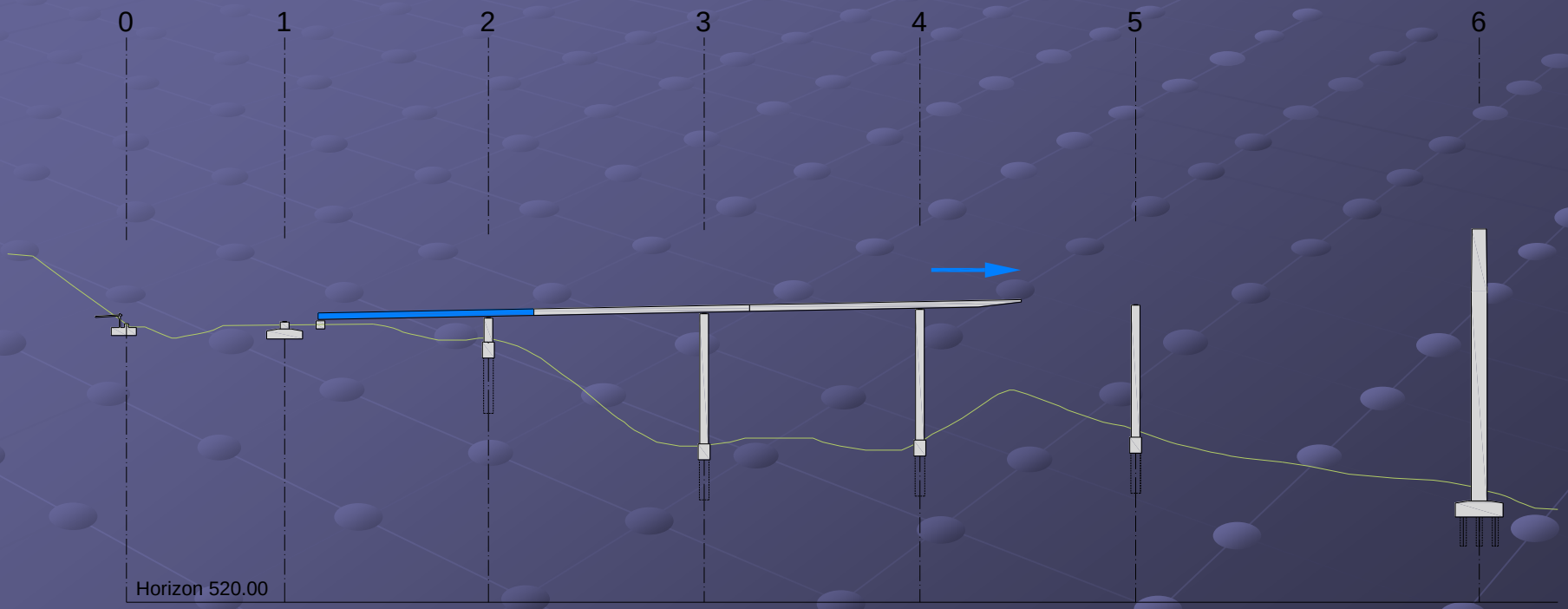
5
6
Horizon 520.00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1
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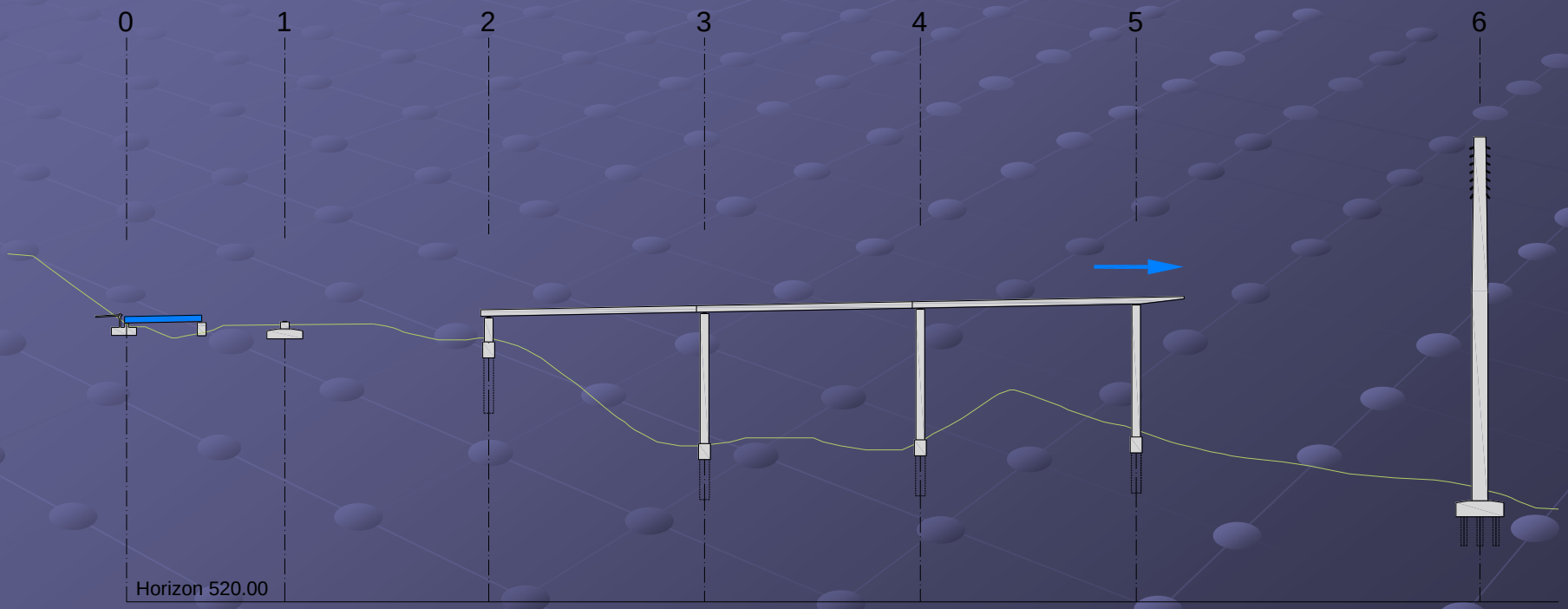
Horizon 520.00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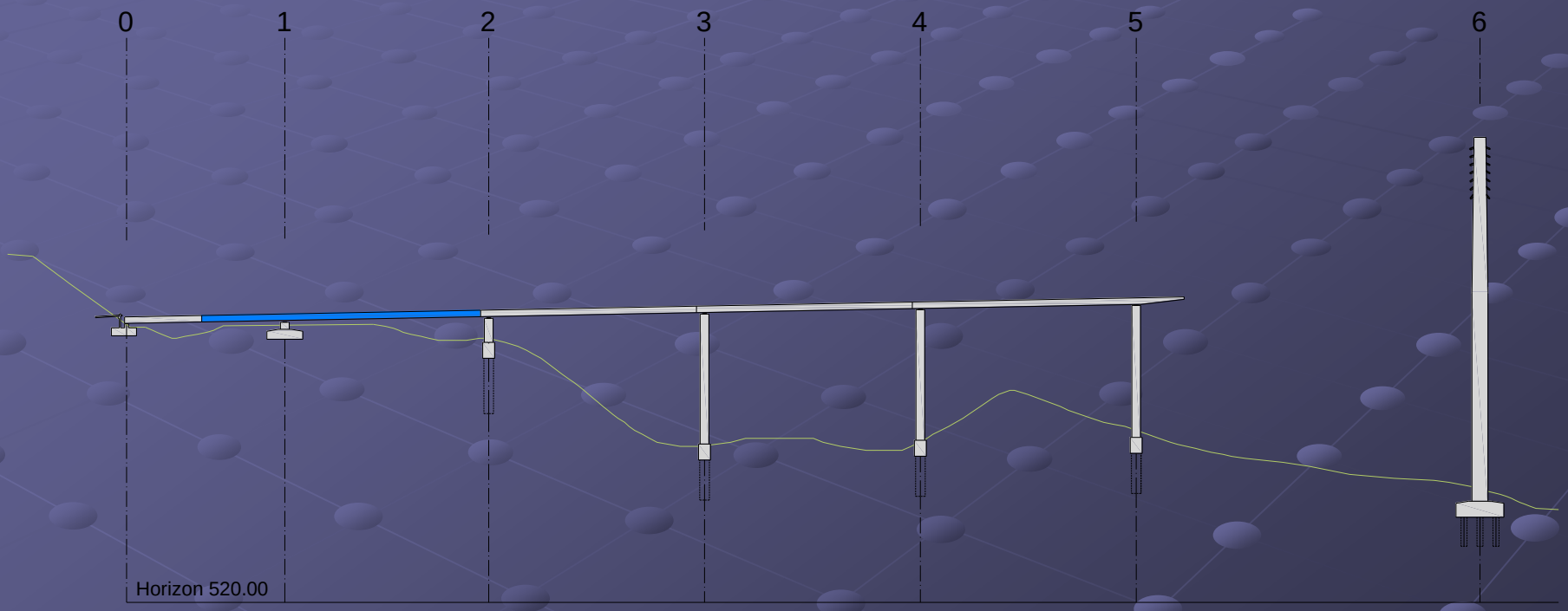
1
2
3
4
5
6
Horizon 520.00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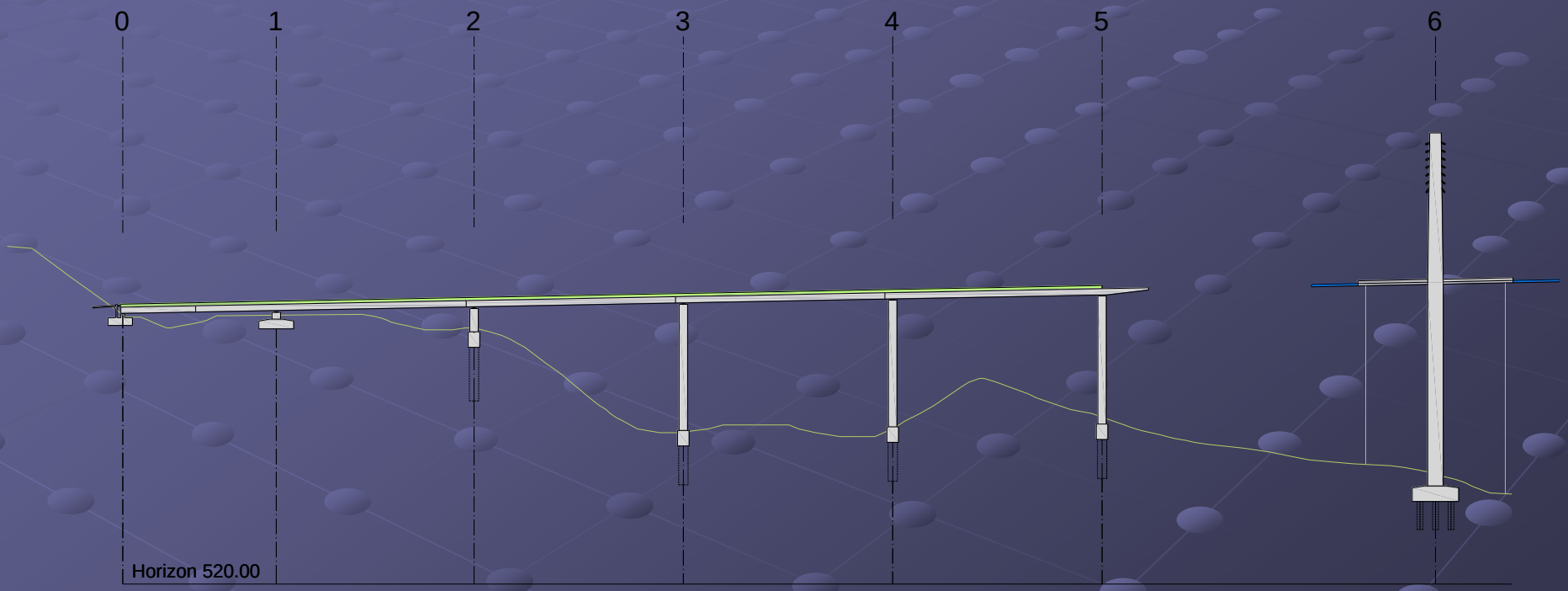
Horizon 520.00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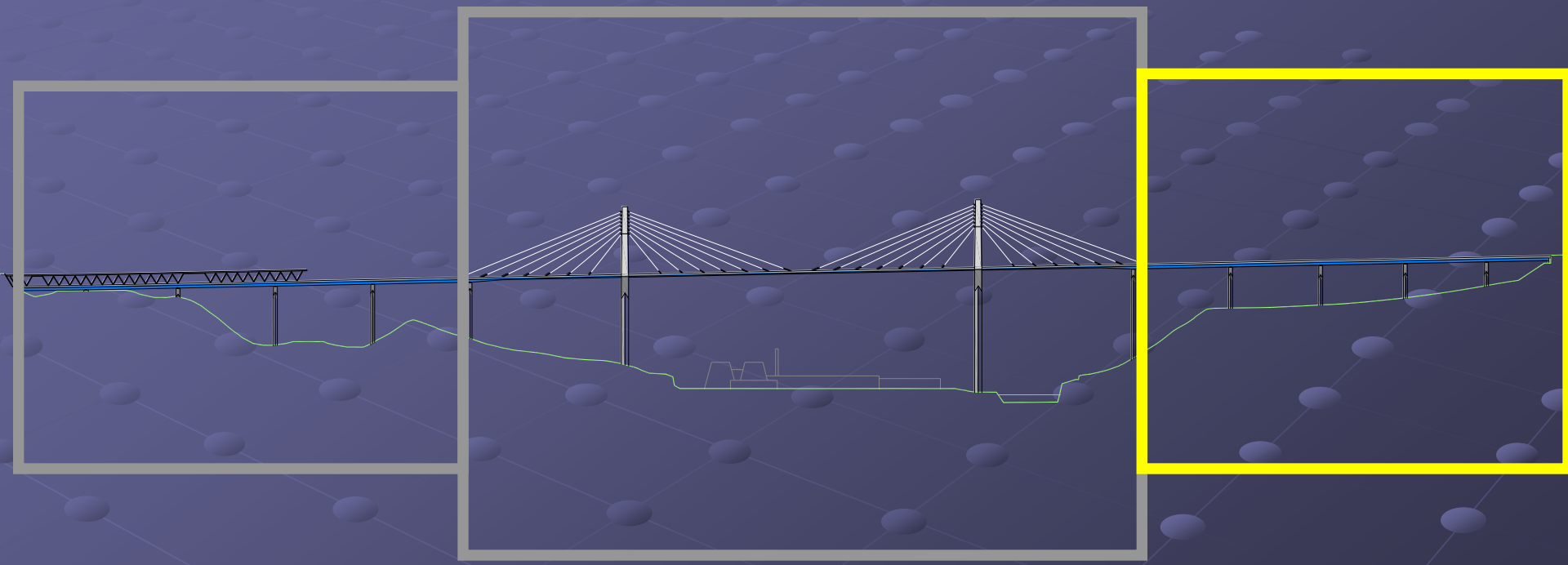
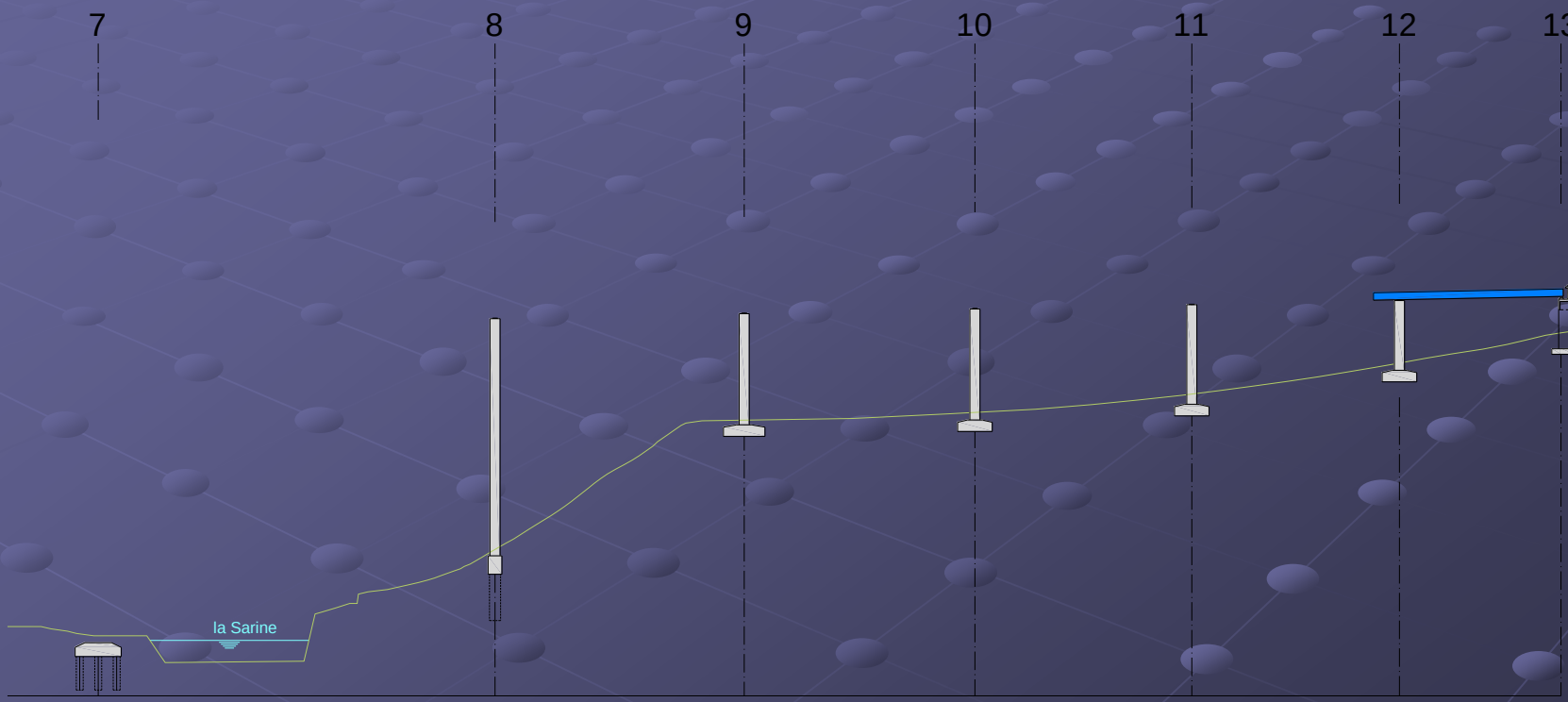
Horizon 520.00

PHASES PRINCIPALES DE MONTAGE

Viaduc d'accès côté Schönberg

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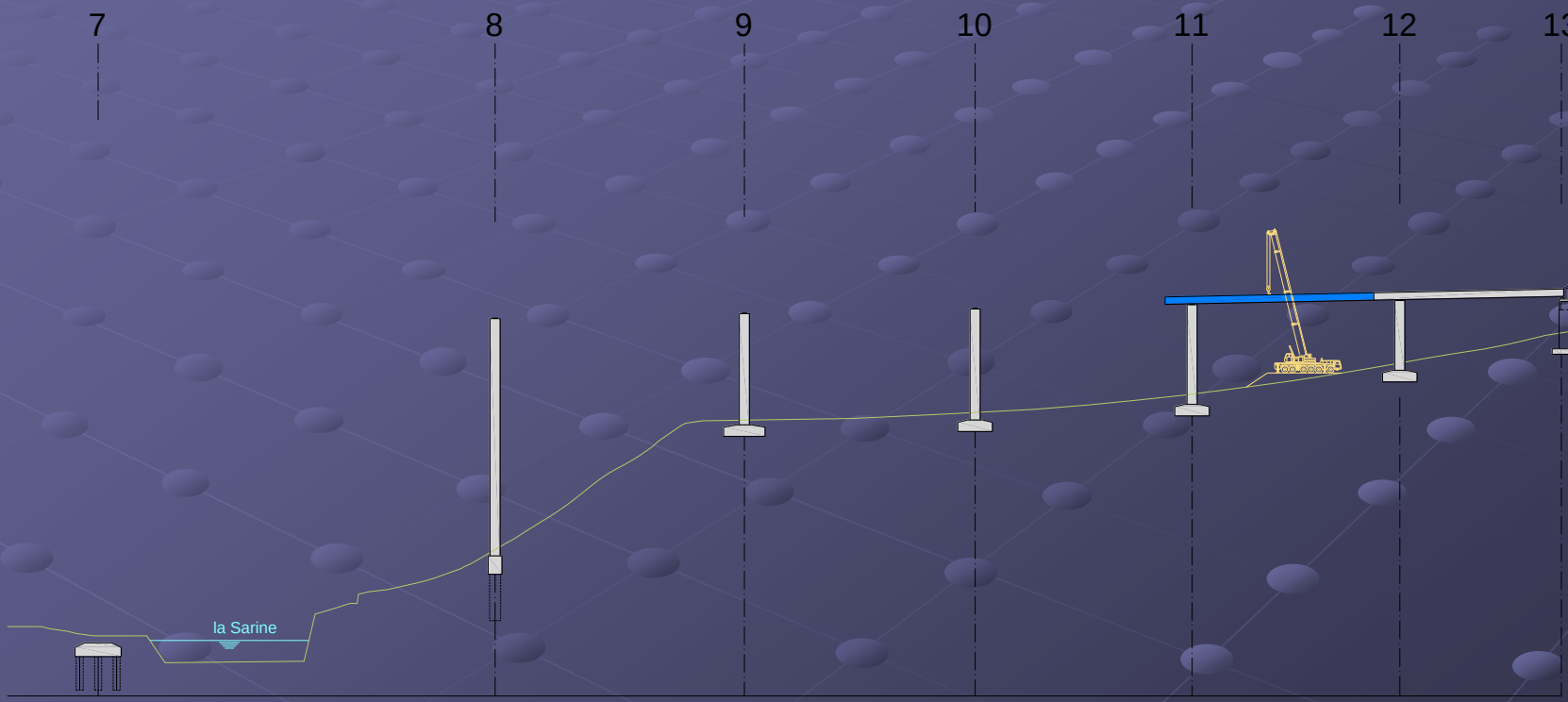
13
la Sarine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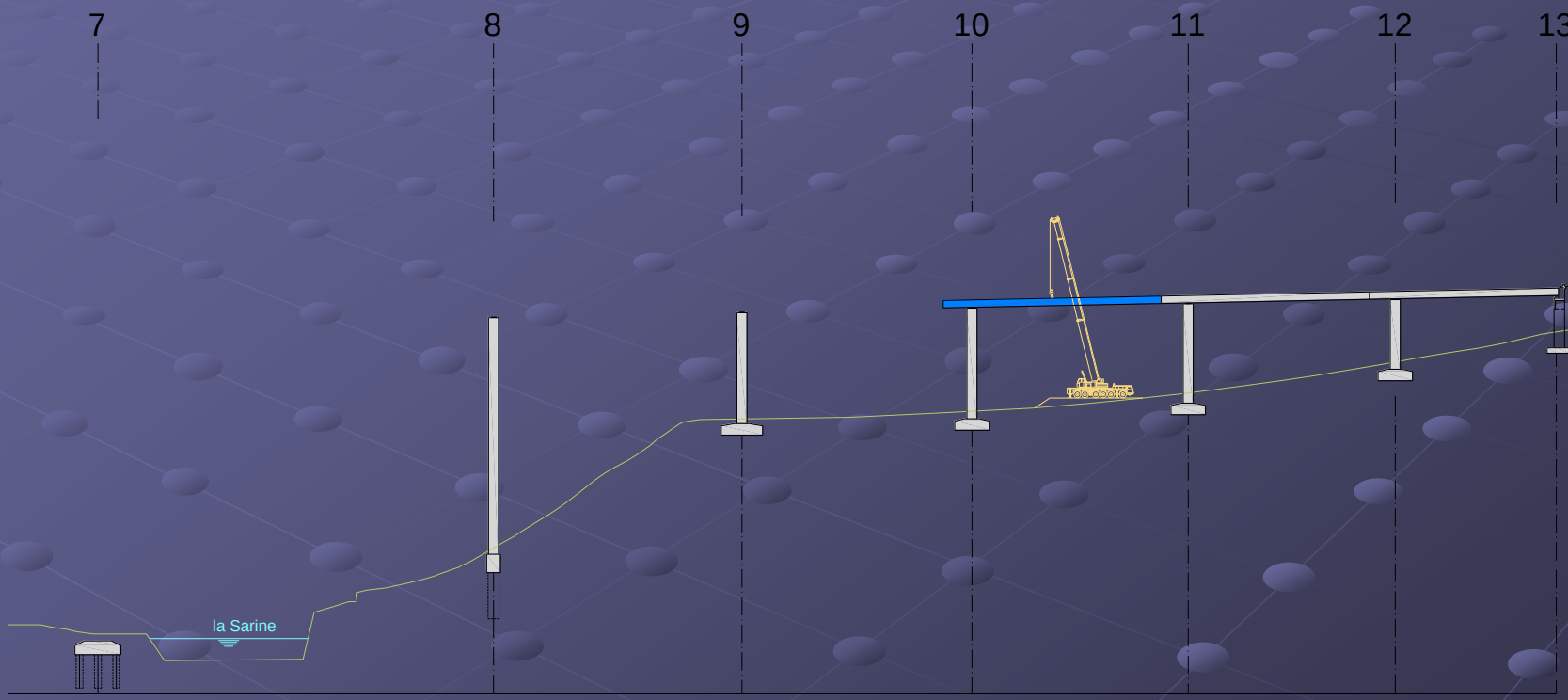
la Sarine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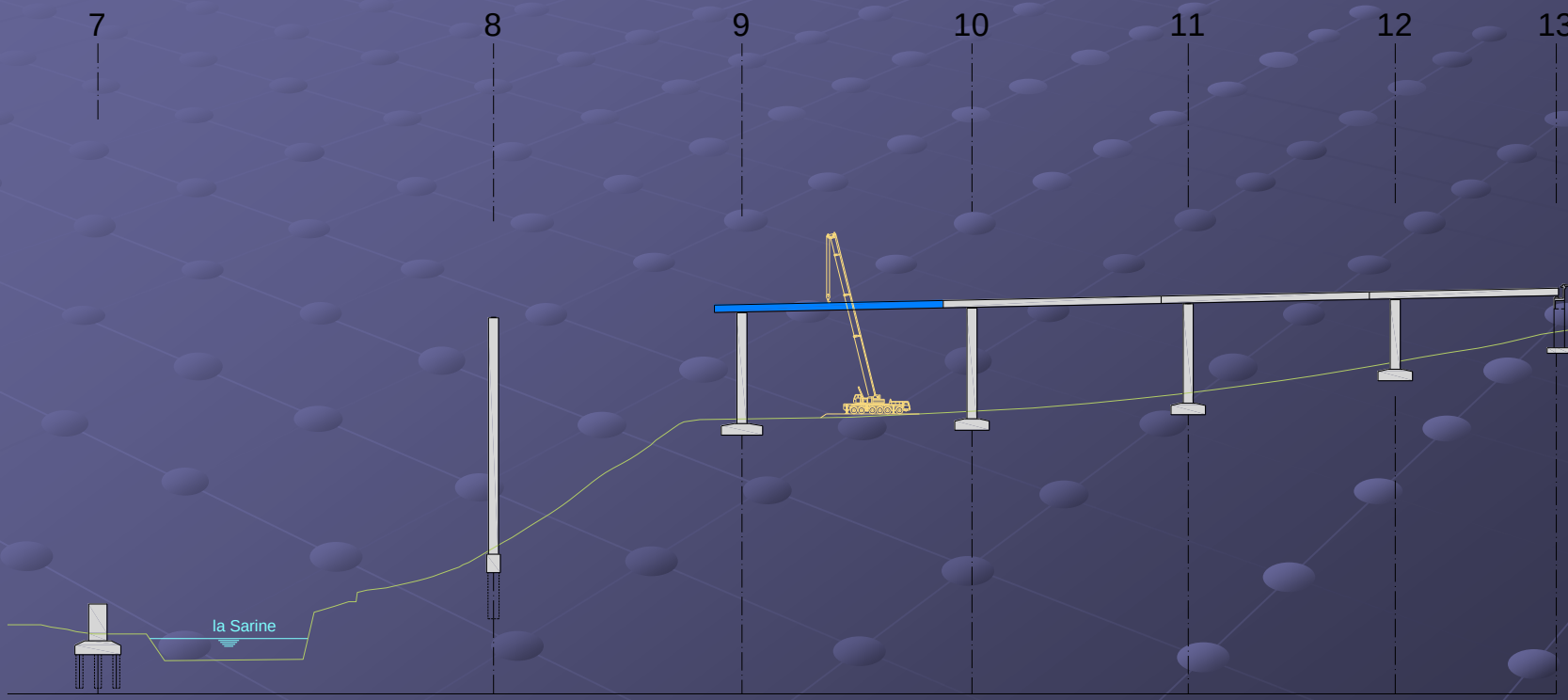
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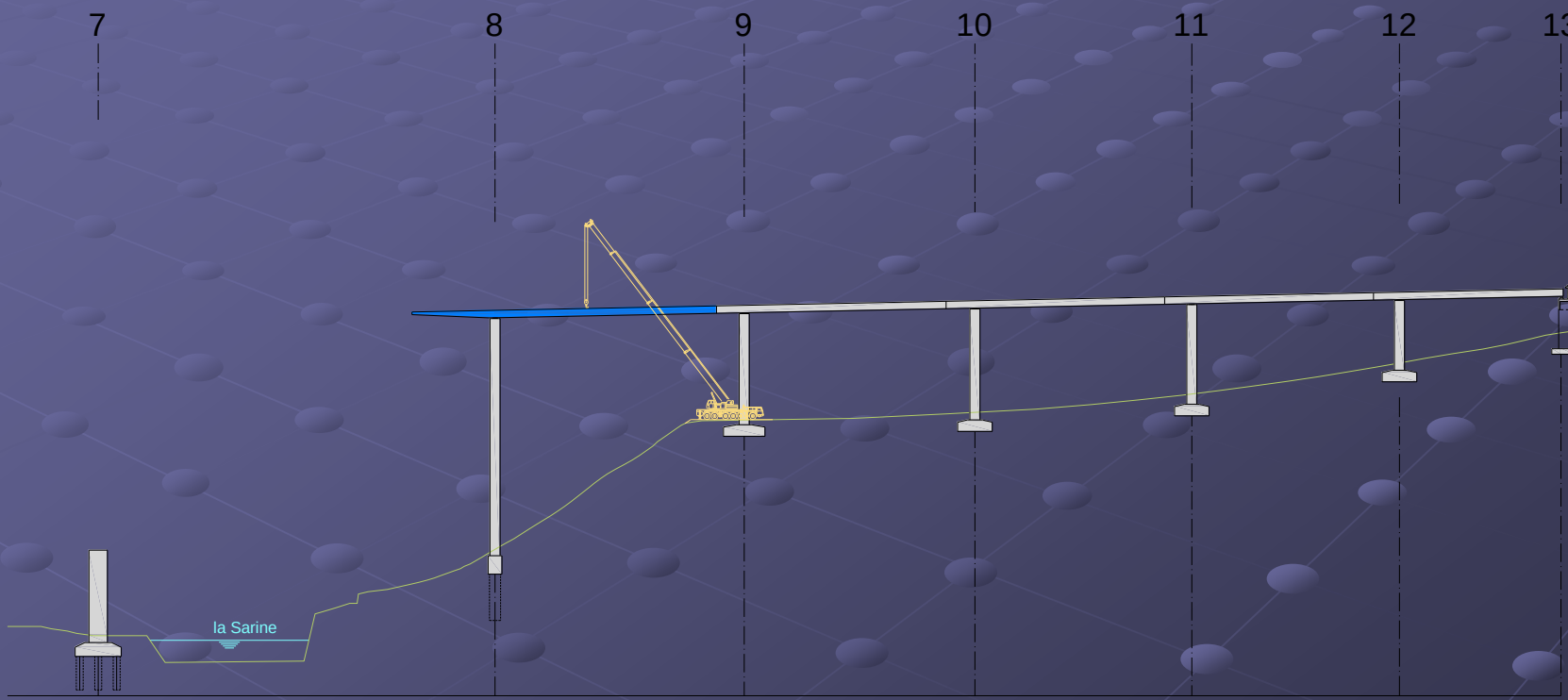
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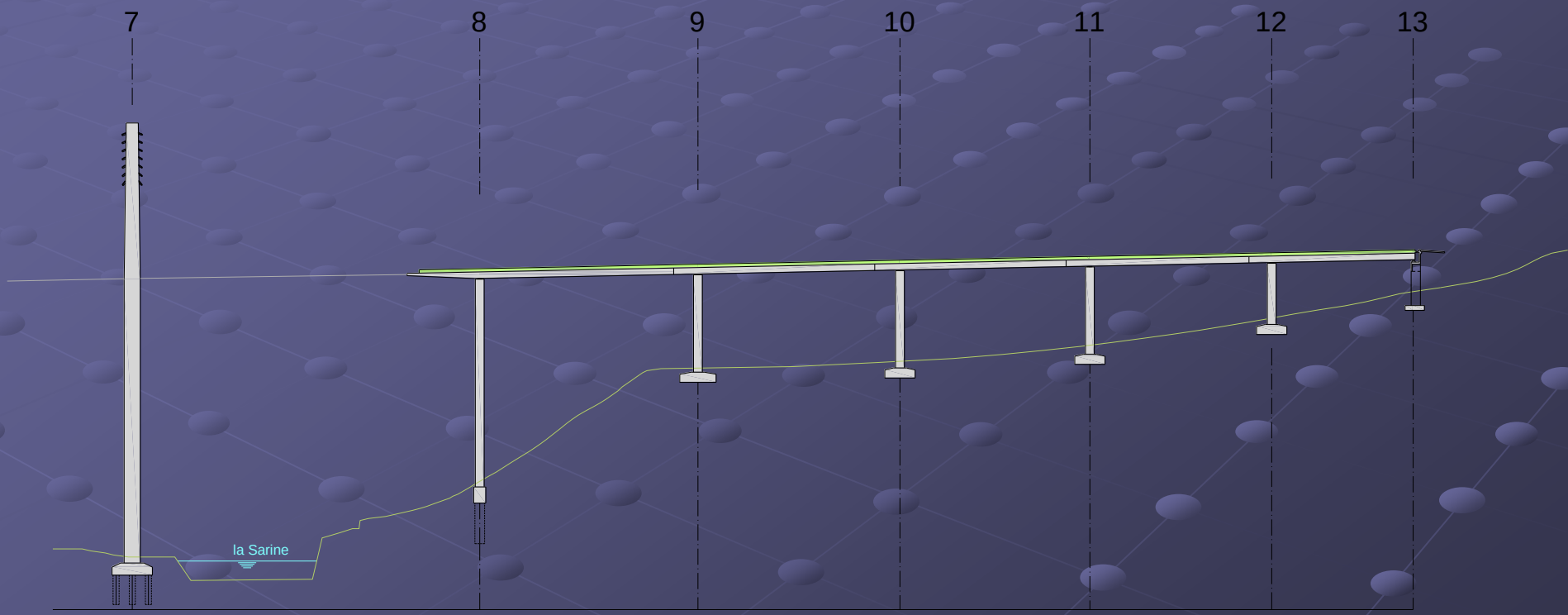
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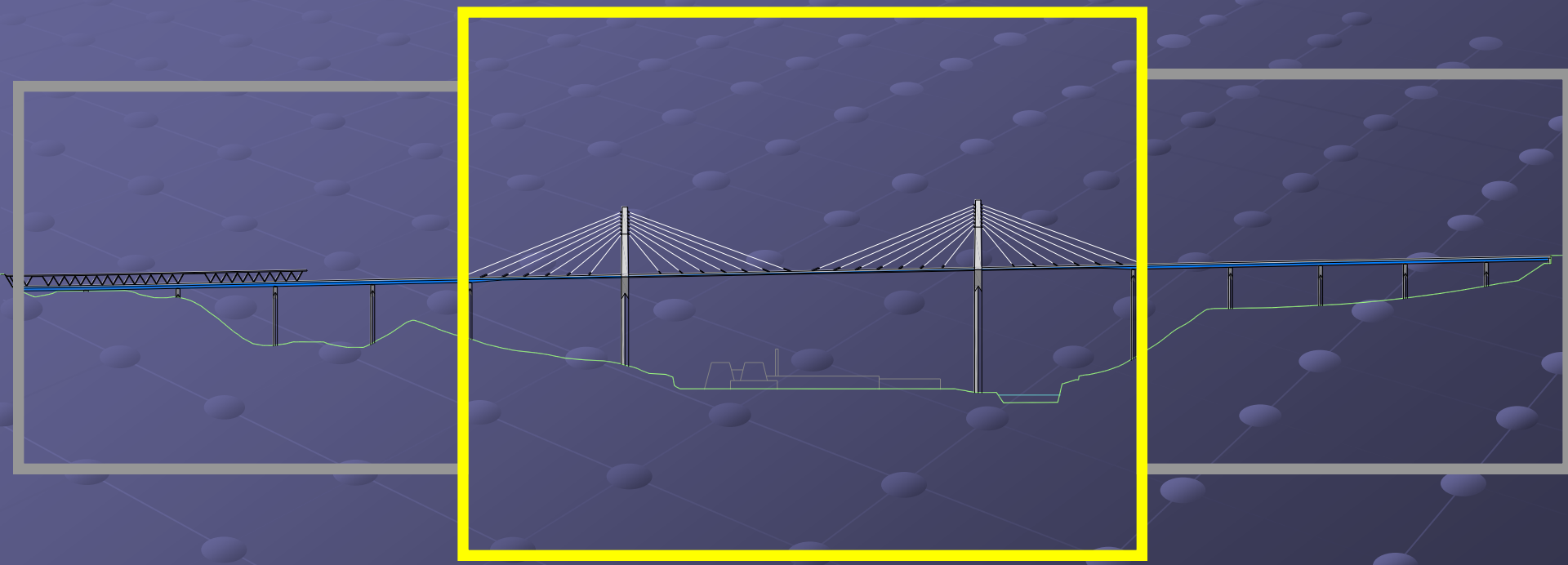
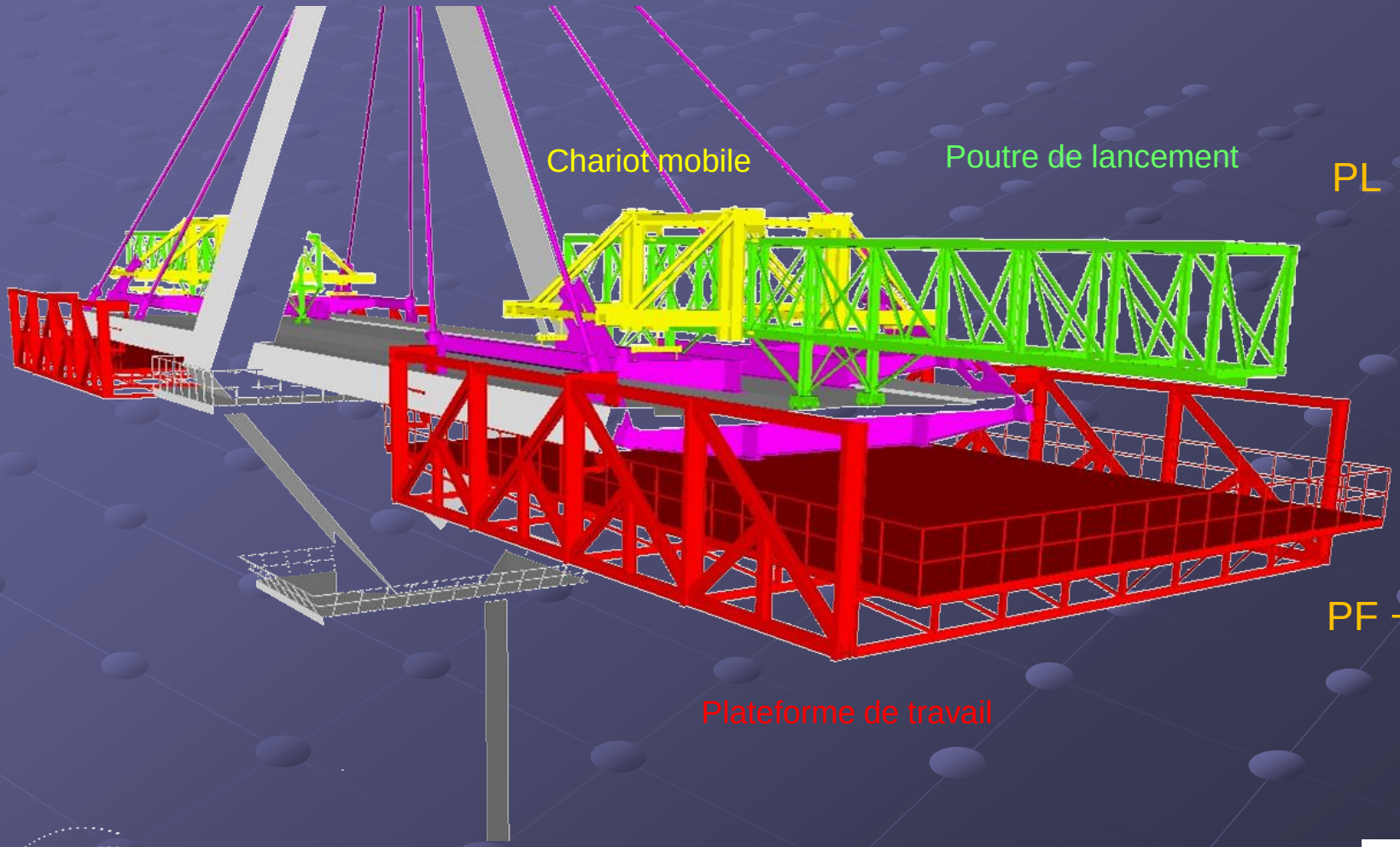
la Sarine

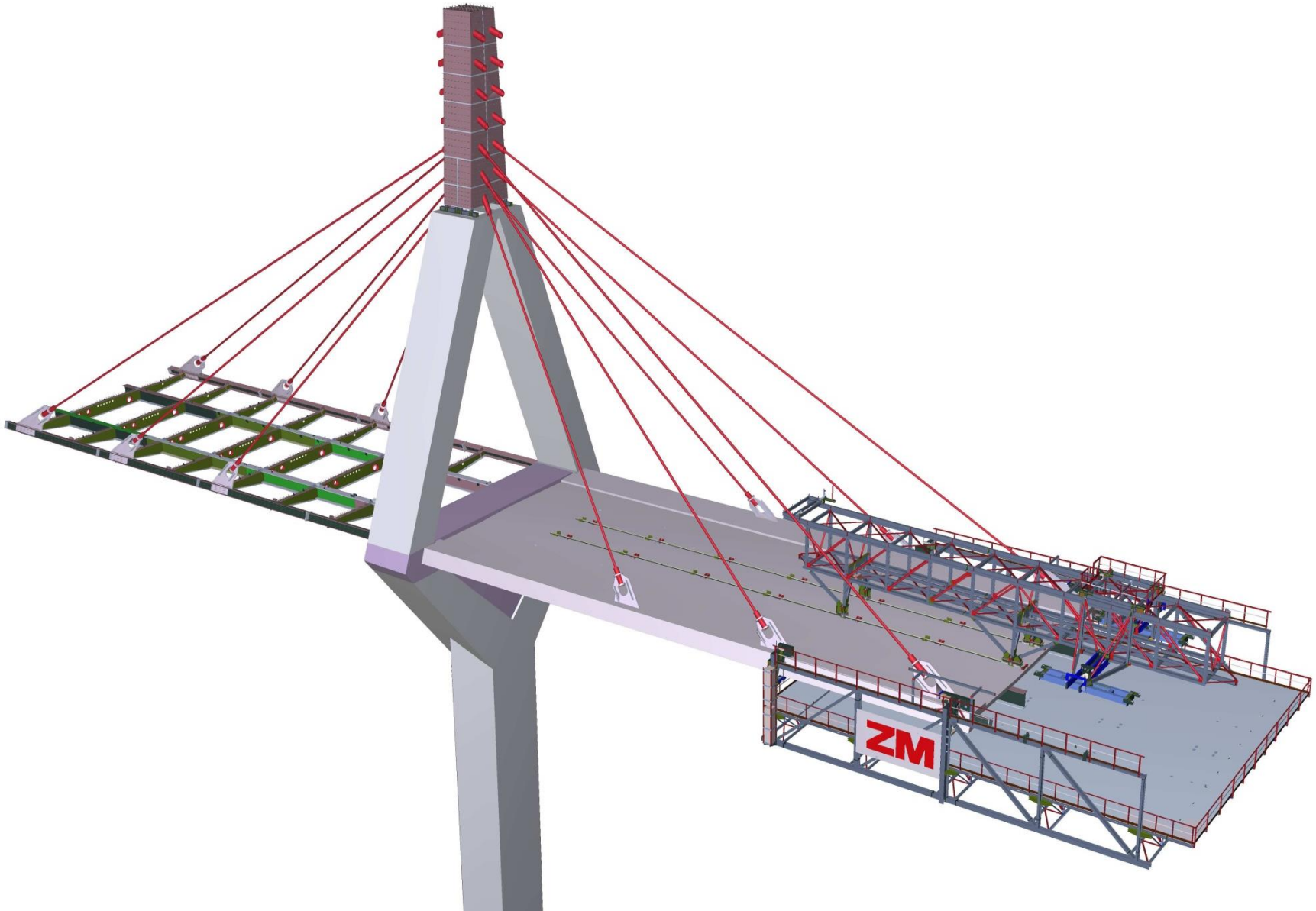
PHASES PRINCIPALES DE MONTAGE

Zone haubanée



Encorbellement haubané

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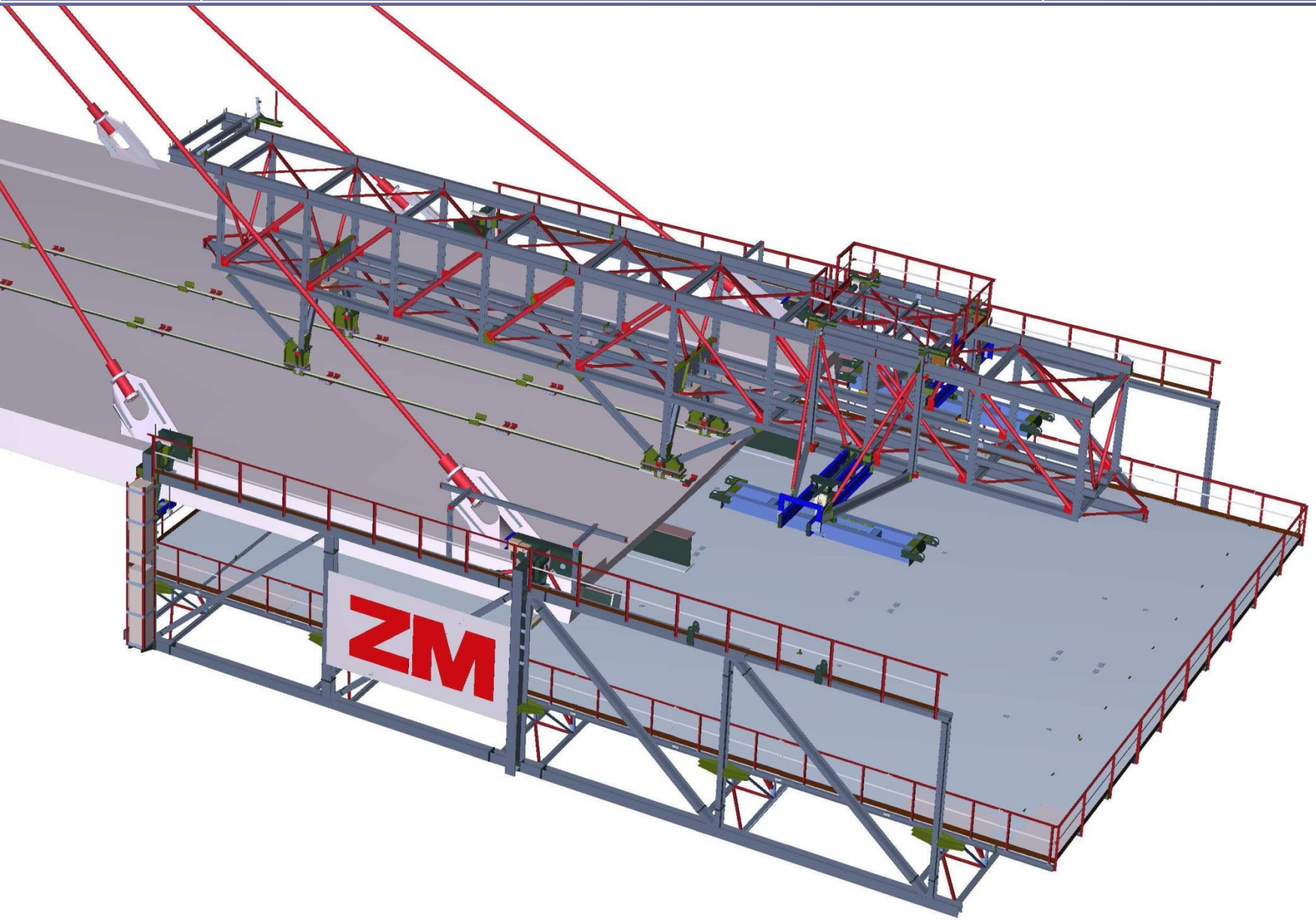
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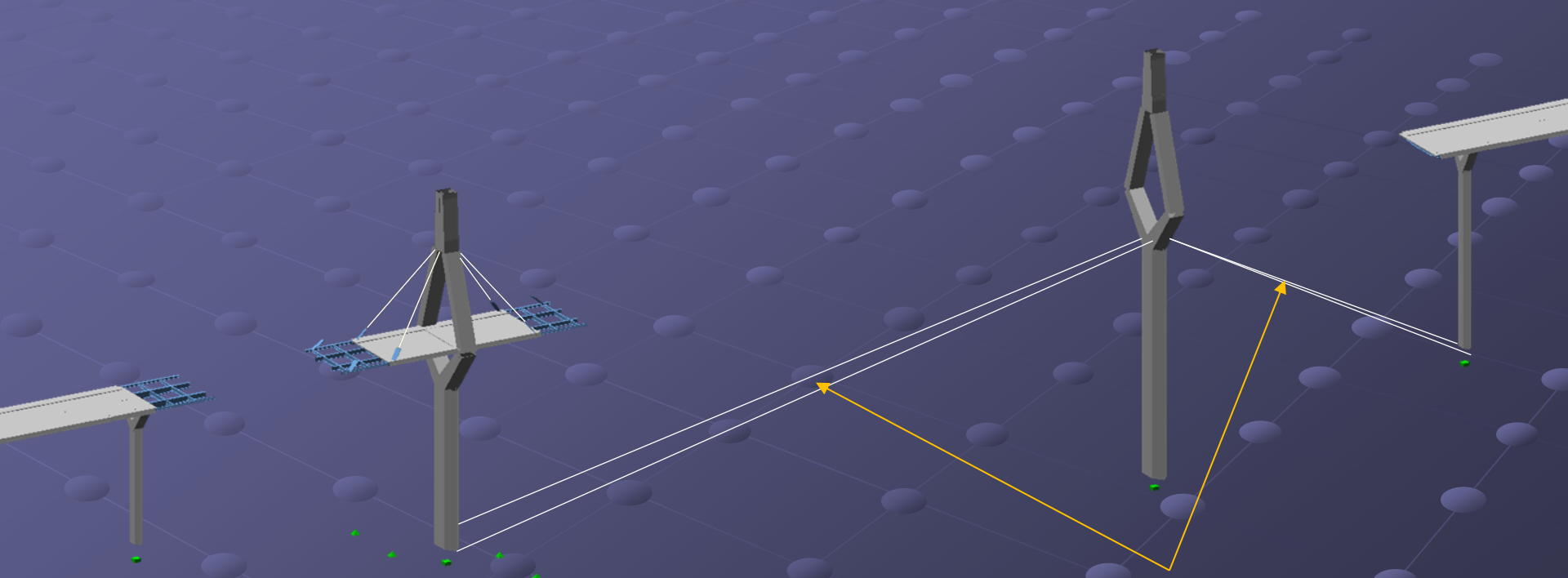
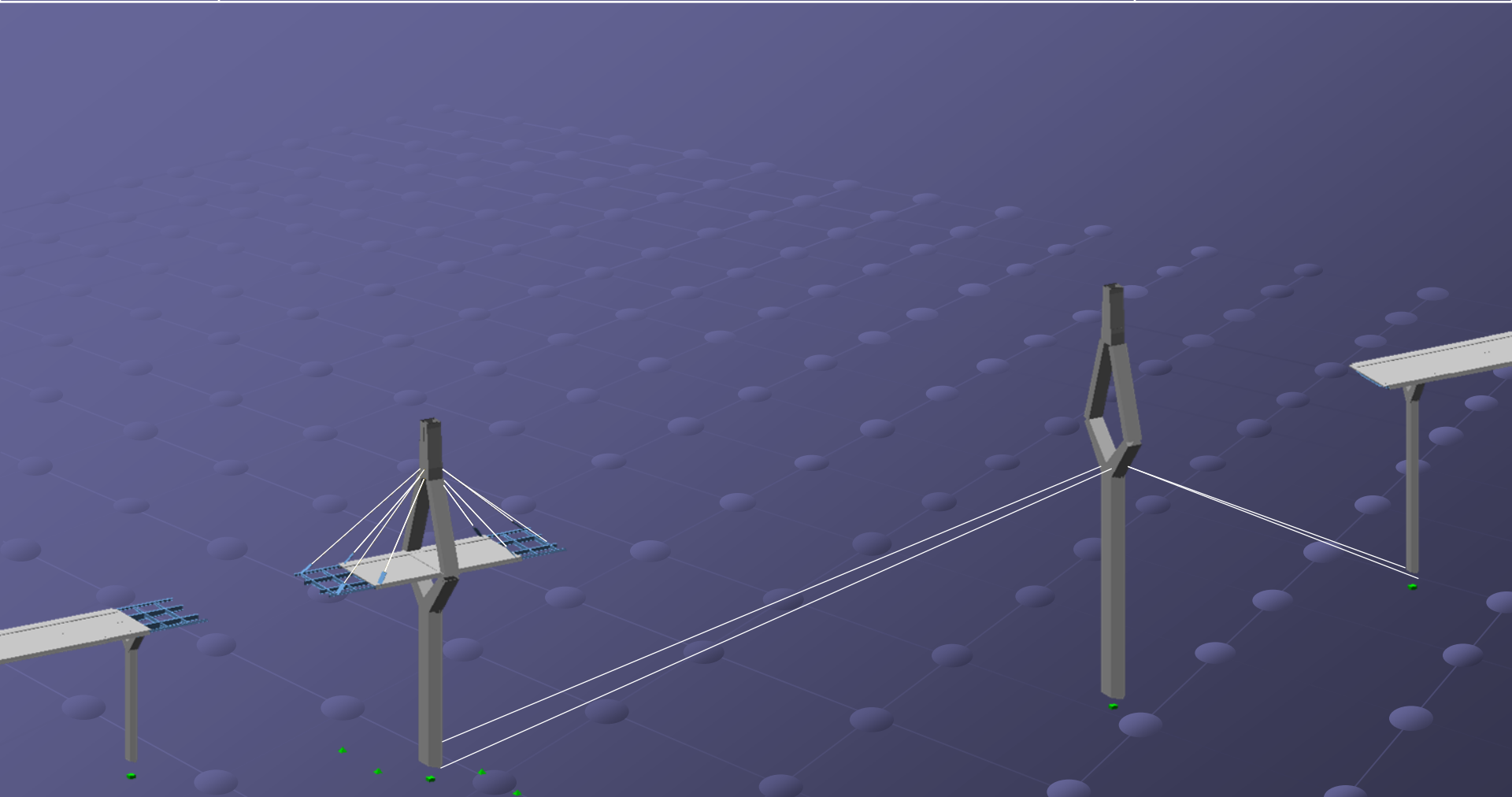
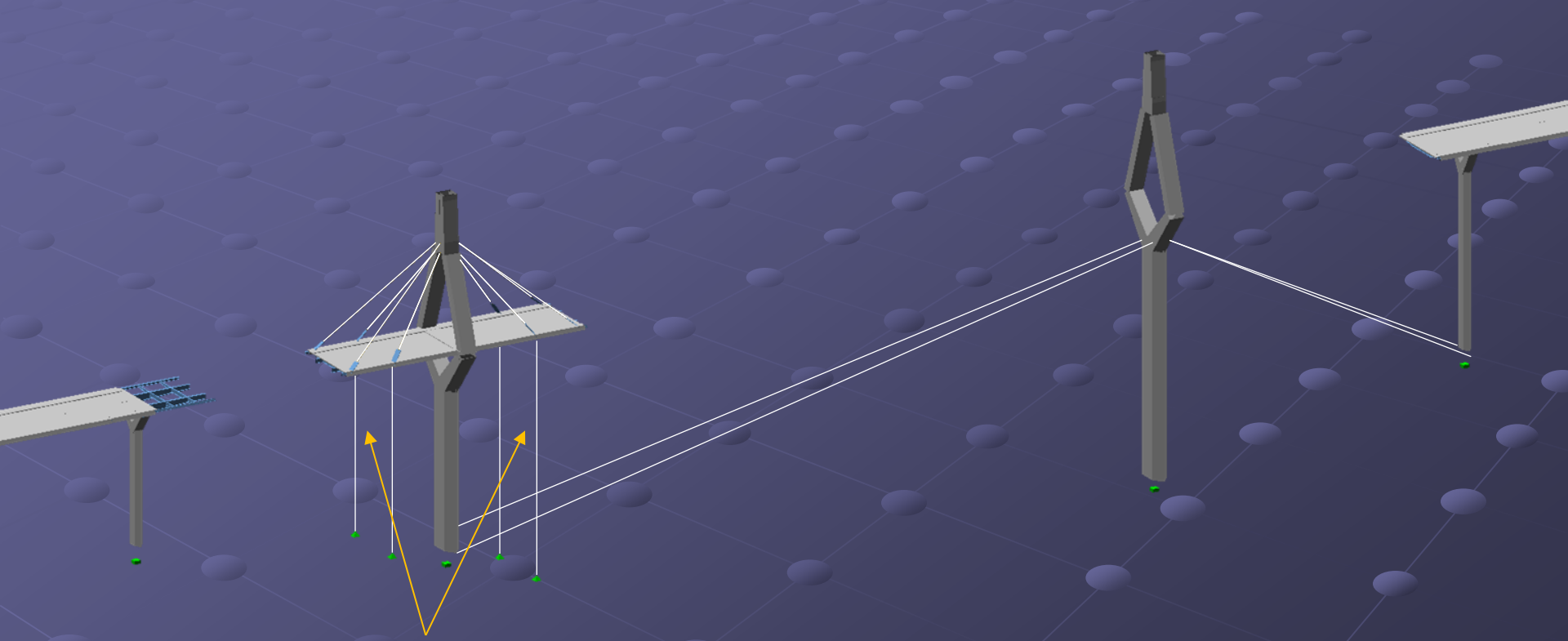


Stabilisation provisoire

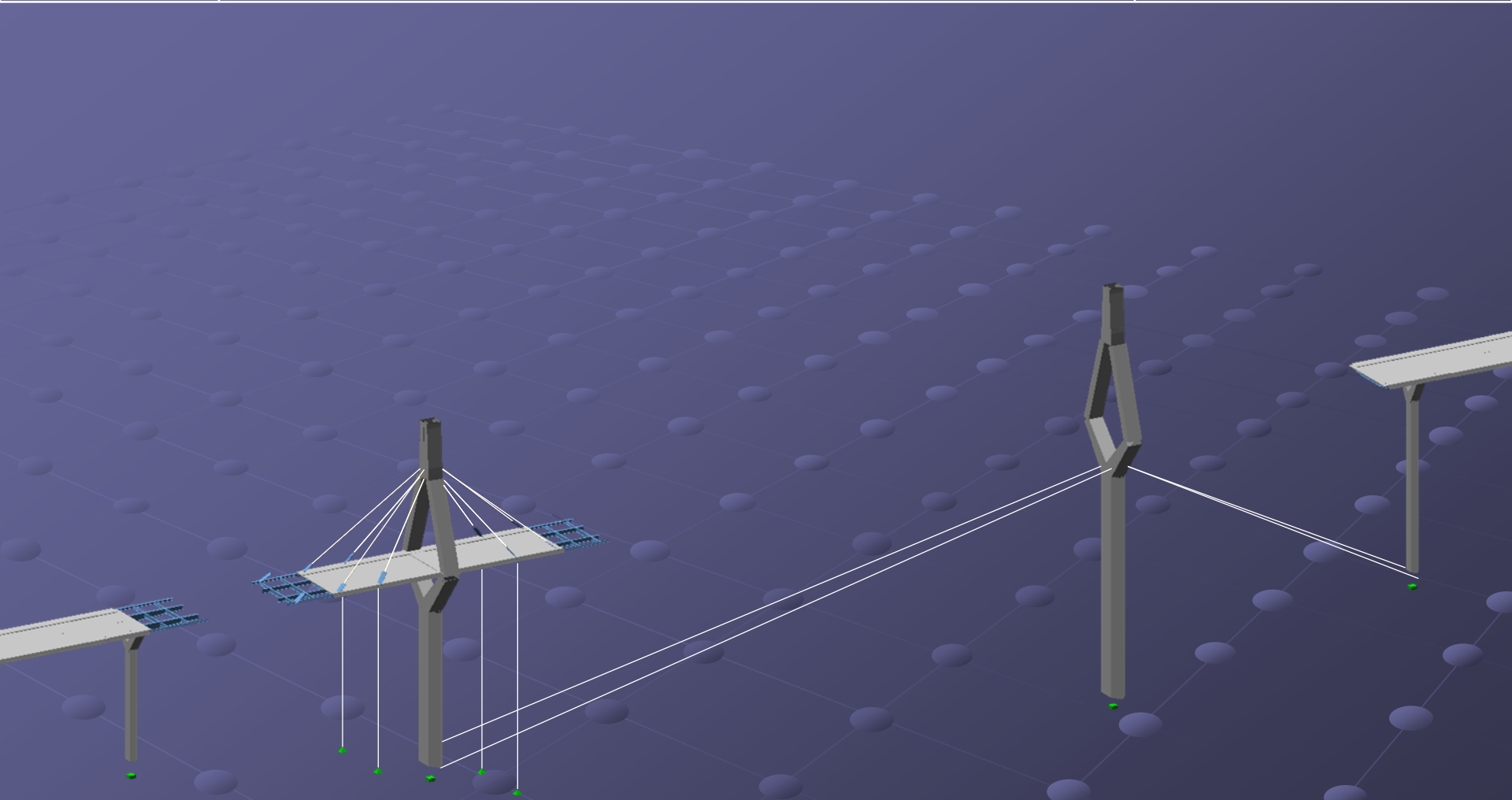


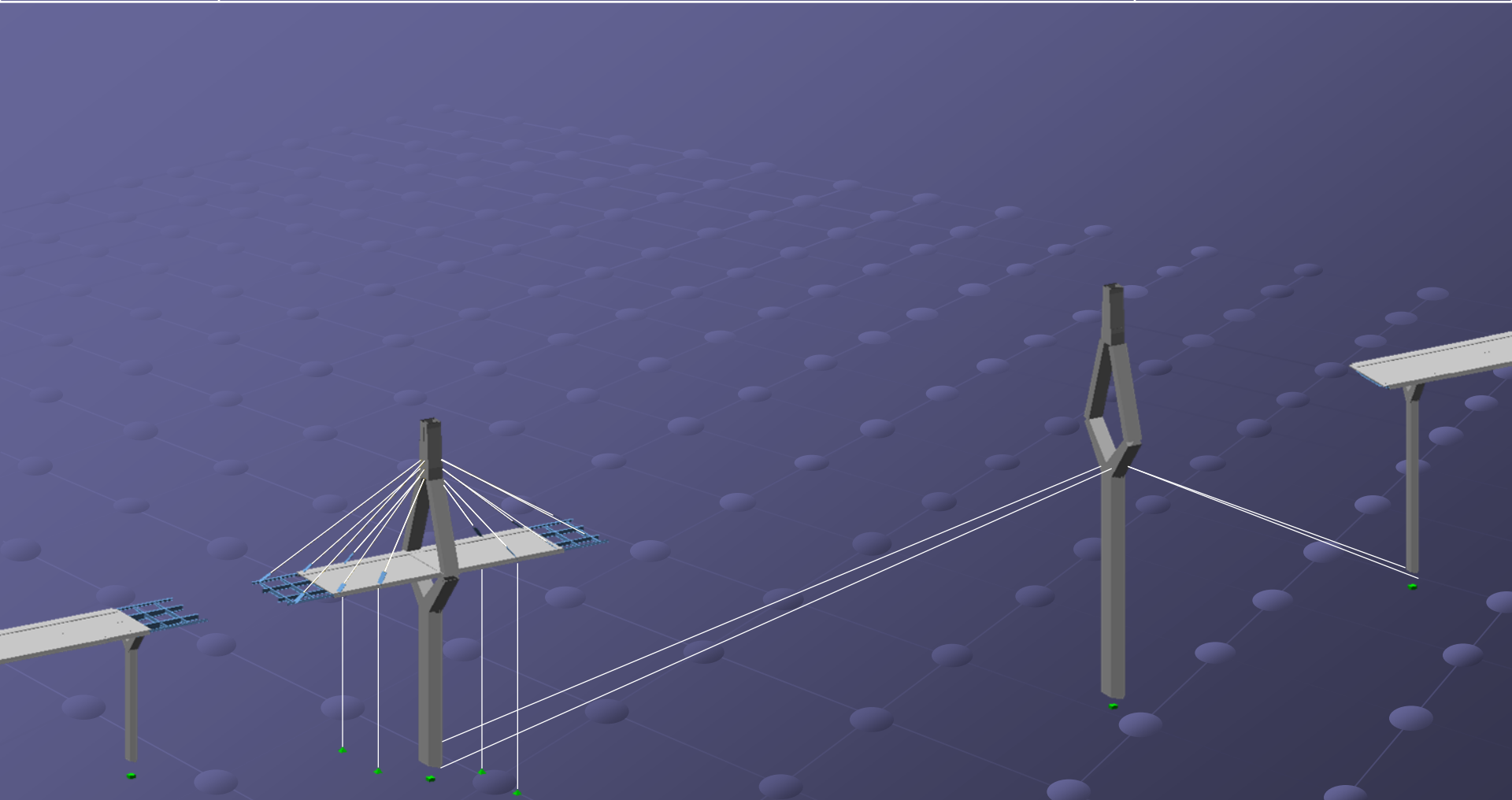


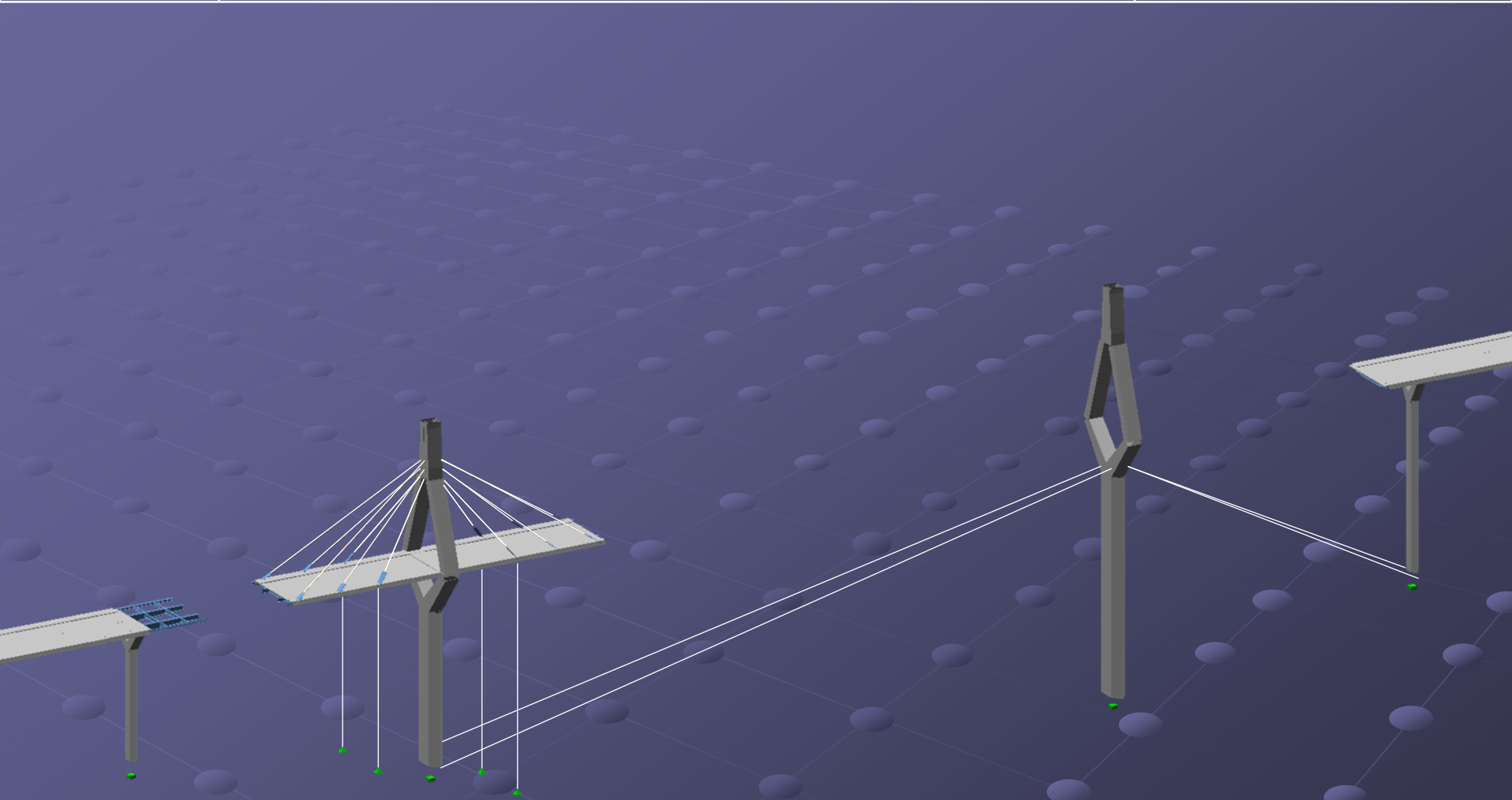
Stabilisation provisoire

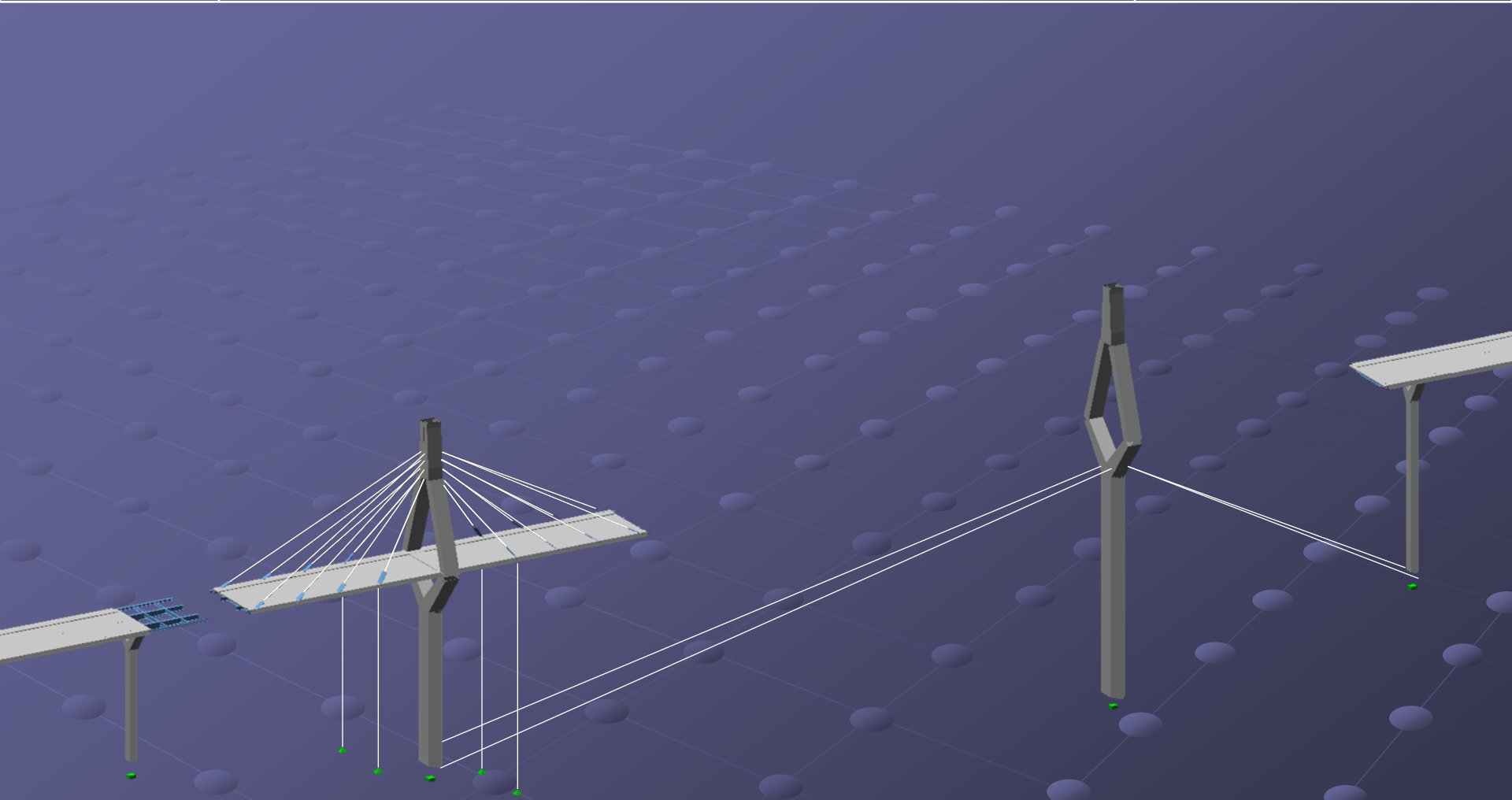
Projet Poya

Pont de la Poya - Procédé de montage



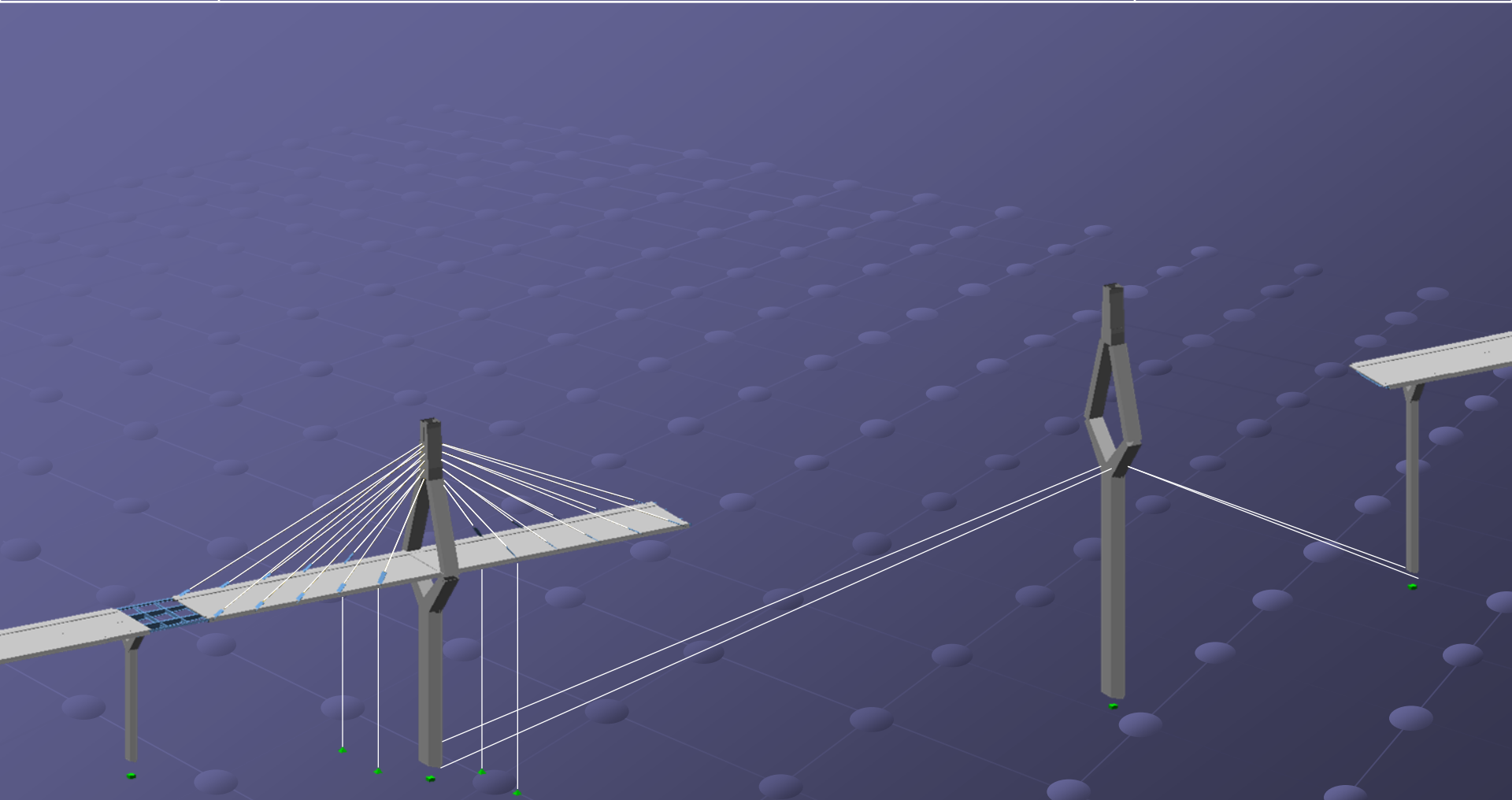


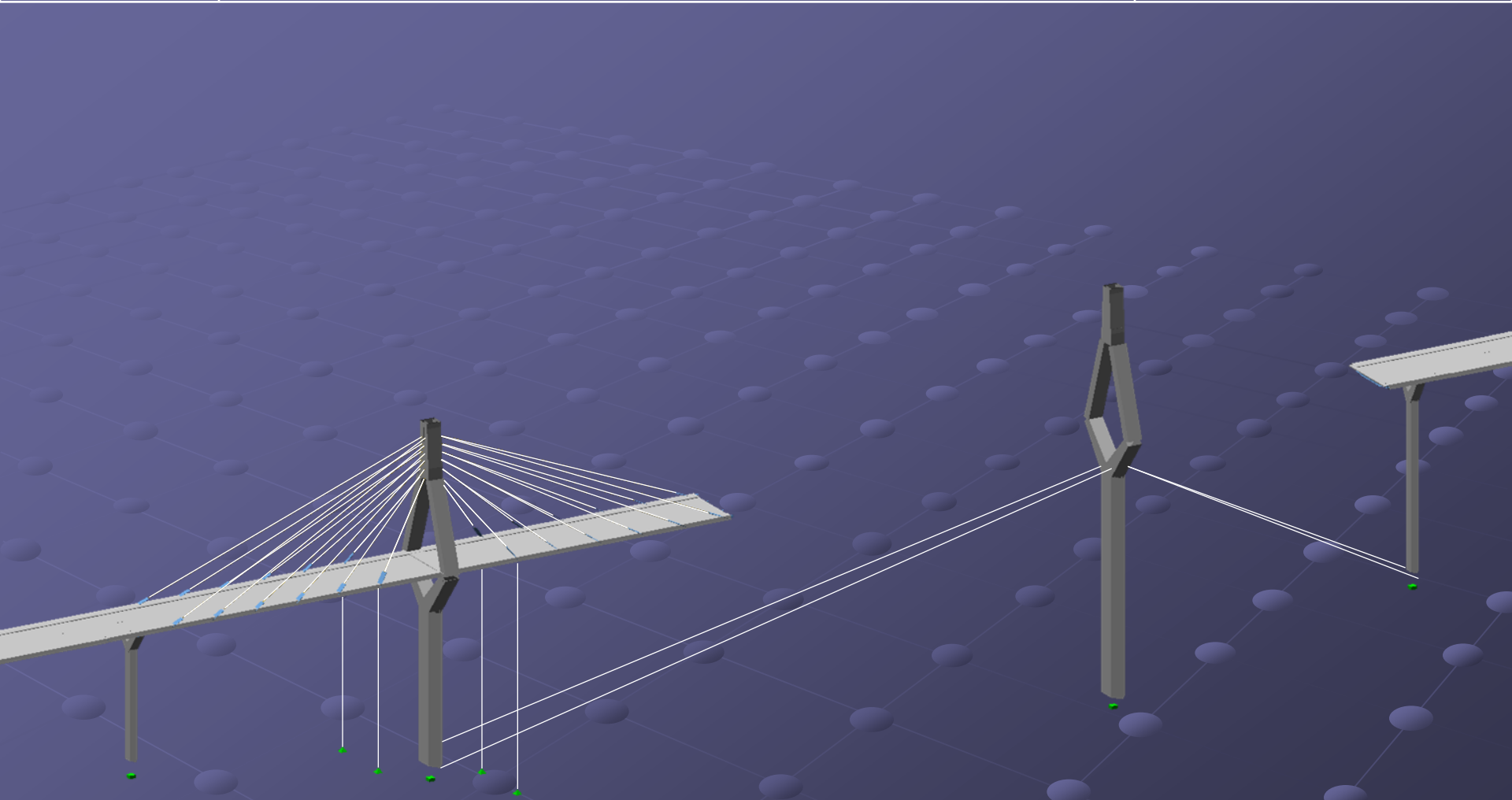


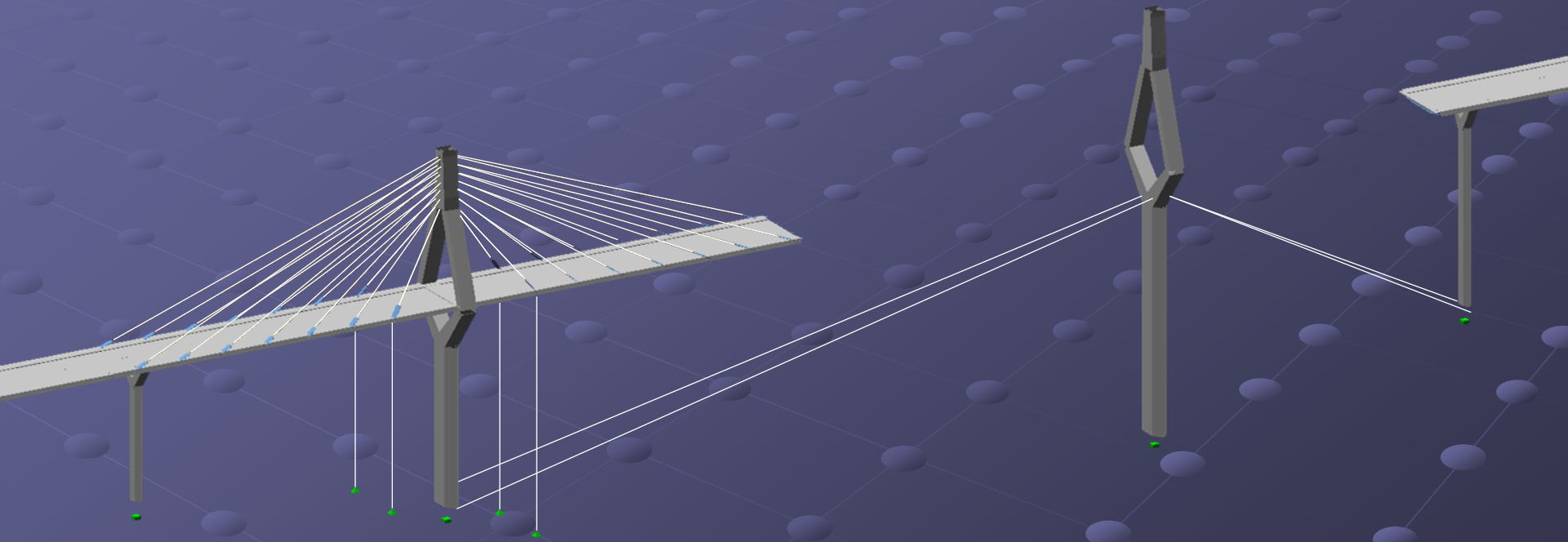


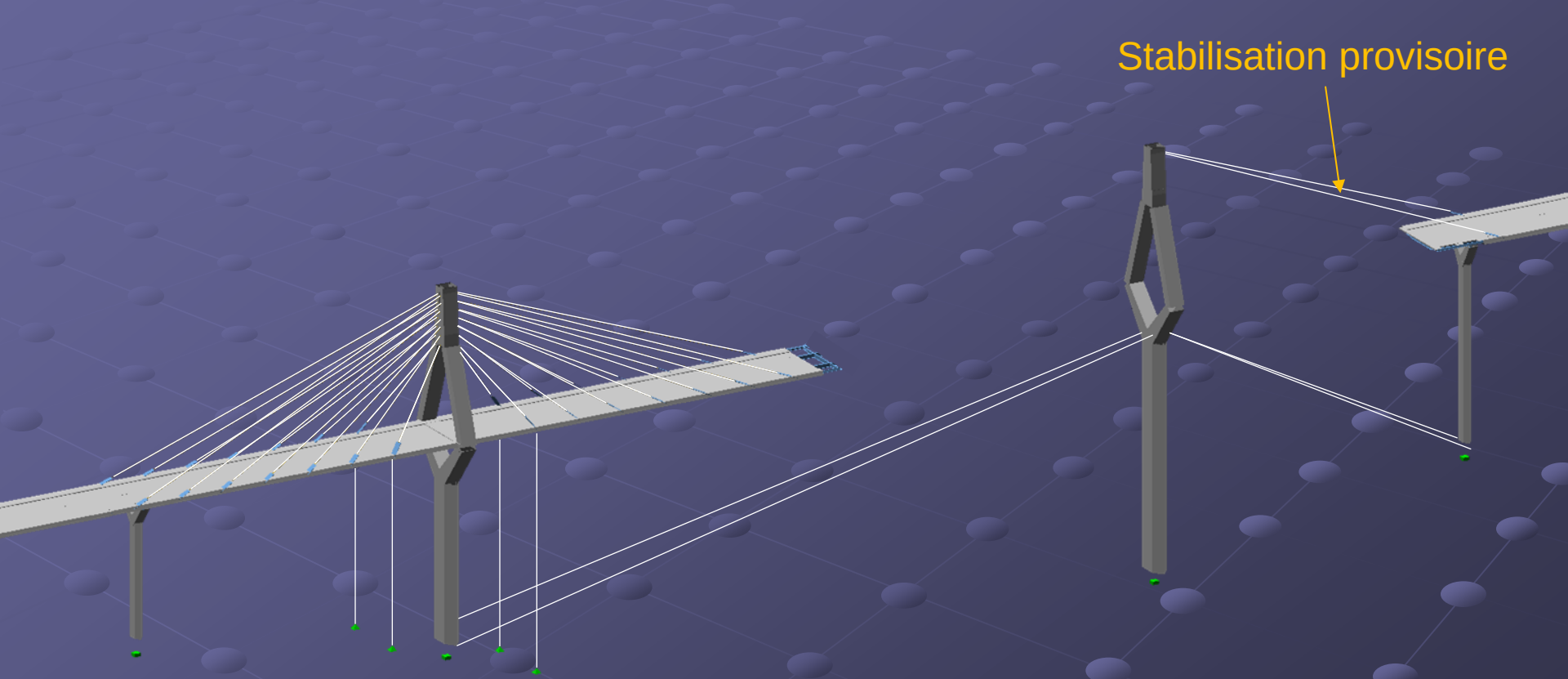
Projet Poya

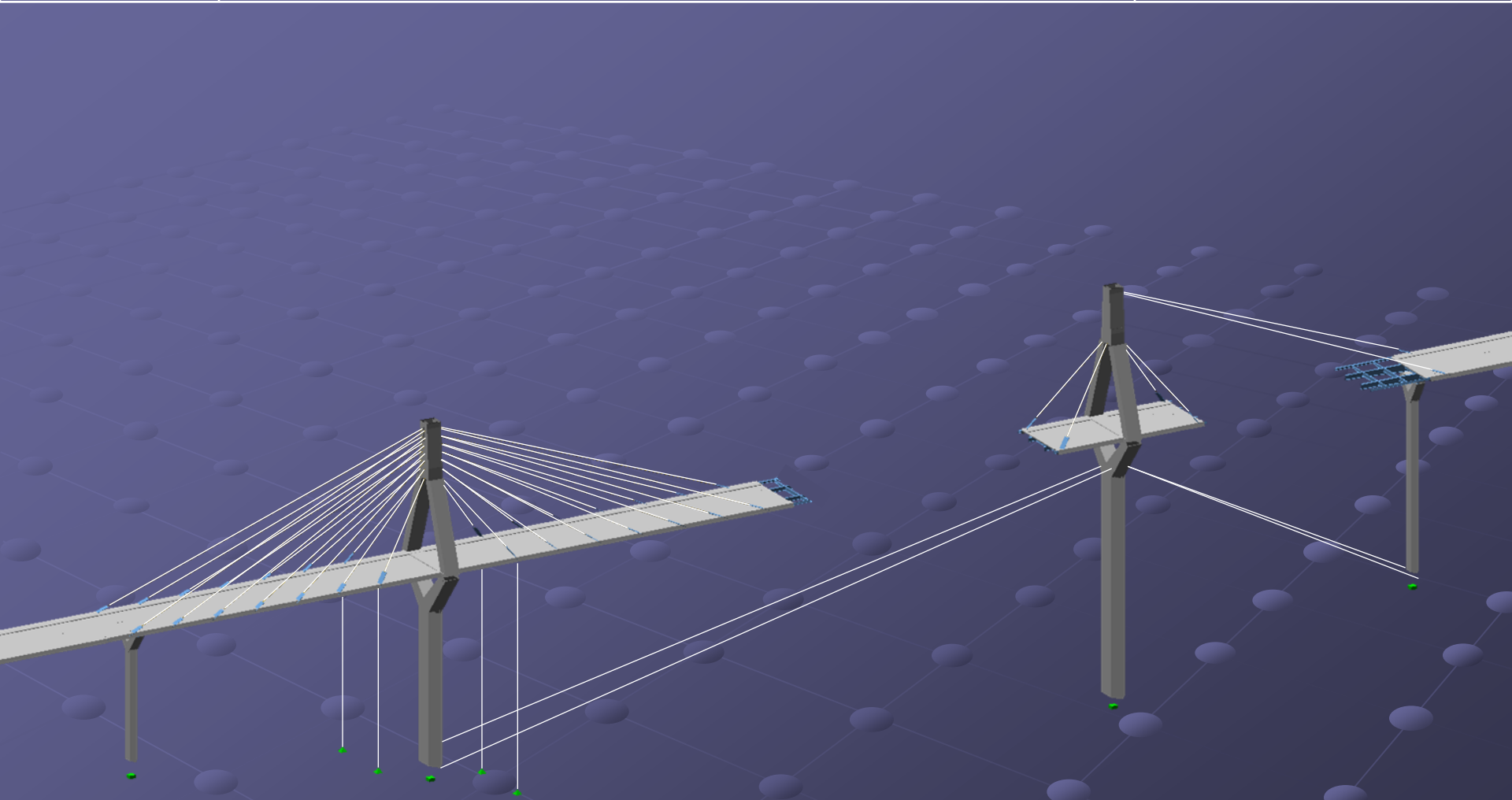
Pont de la Poya - Procédé de montage





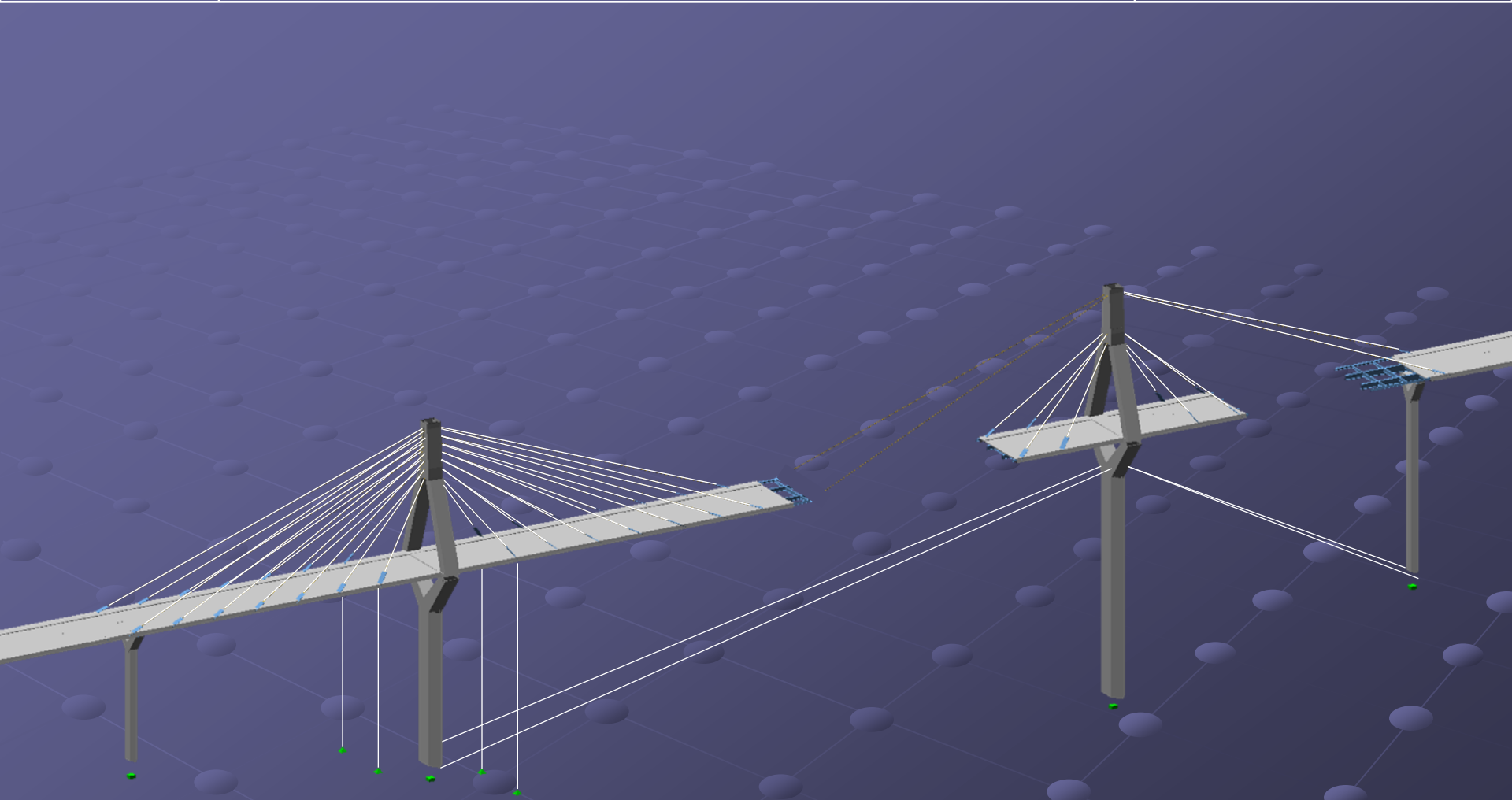



Stabilisation provisoire



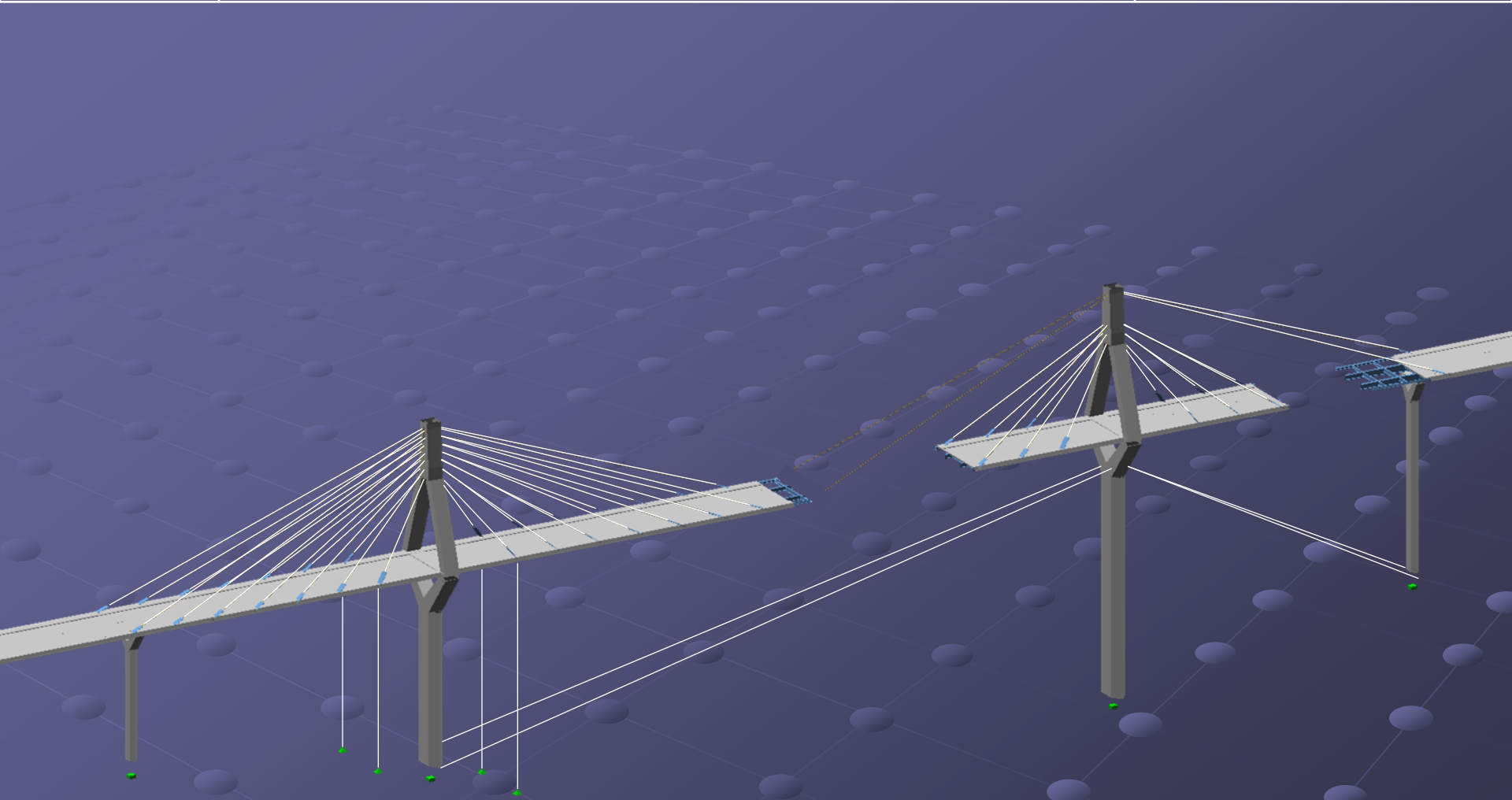
Projet Poya

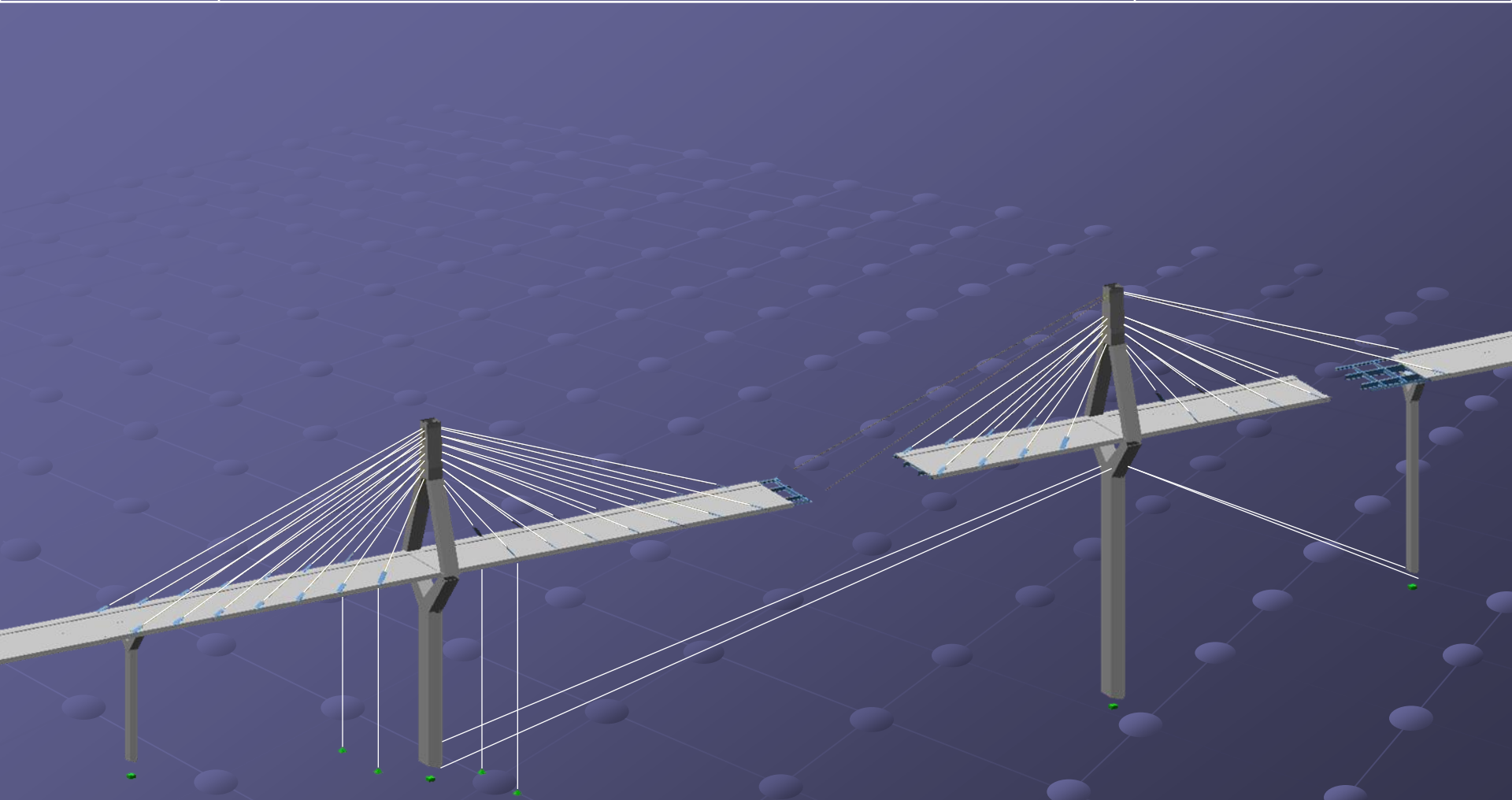
Pont de la Poya - Procédé de montage

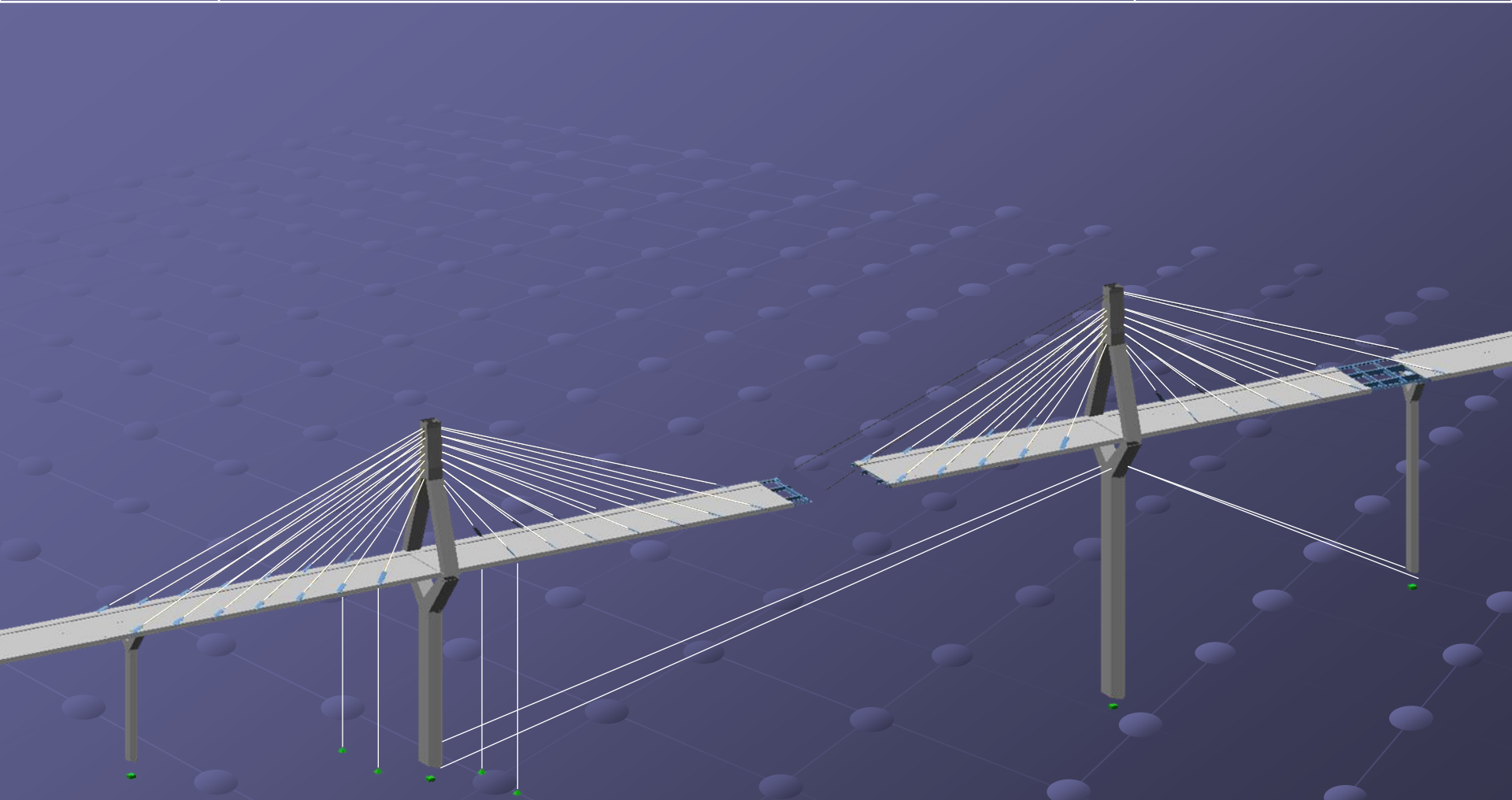


Projet Poya

Pont de la Poya - Procédé de montage

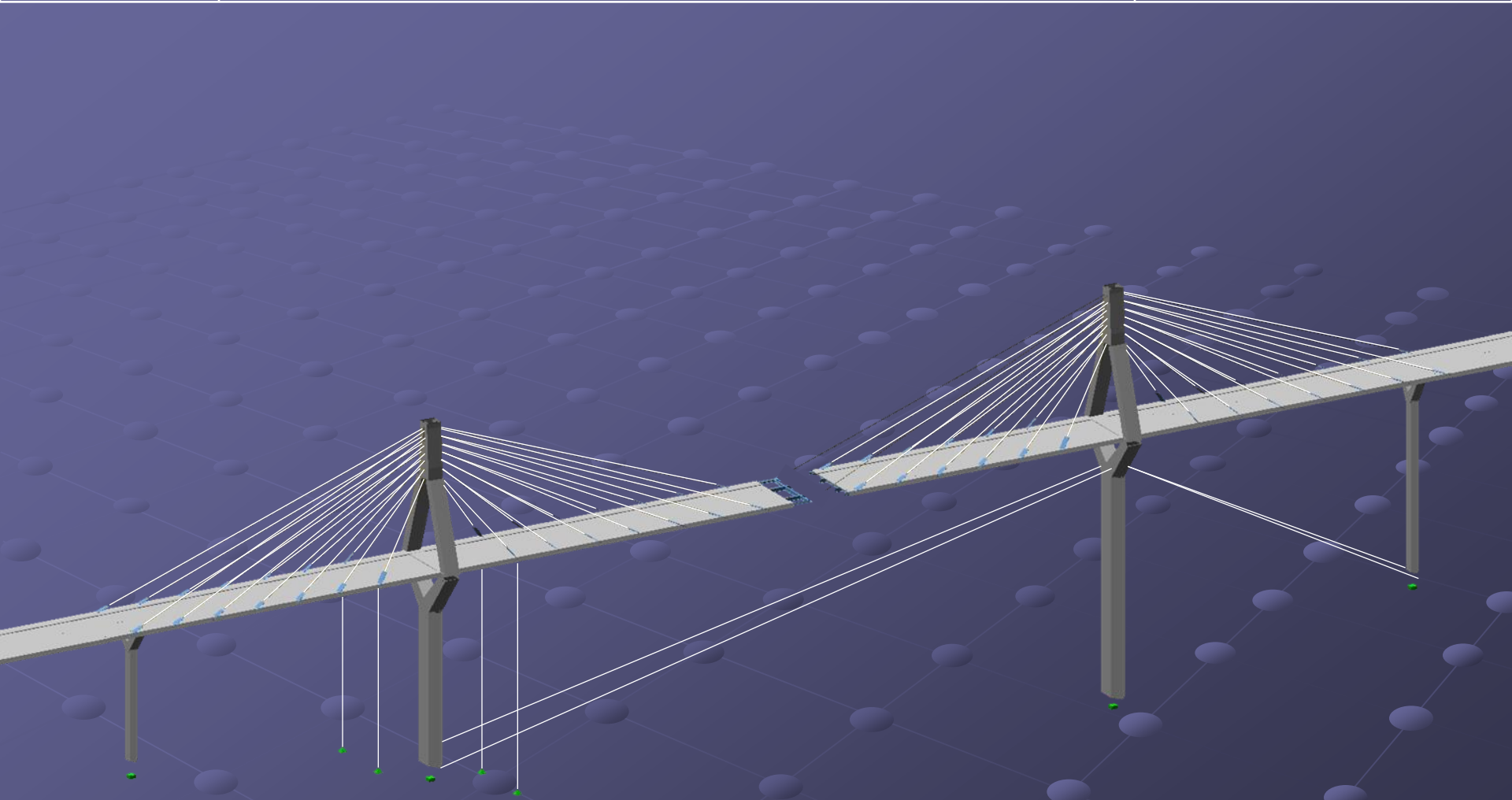




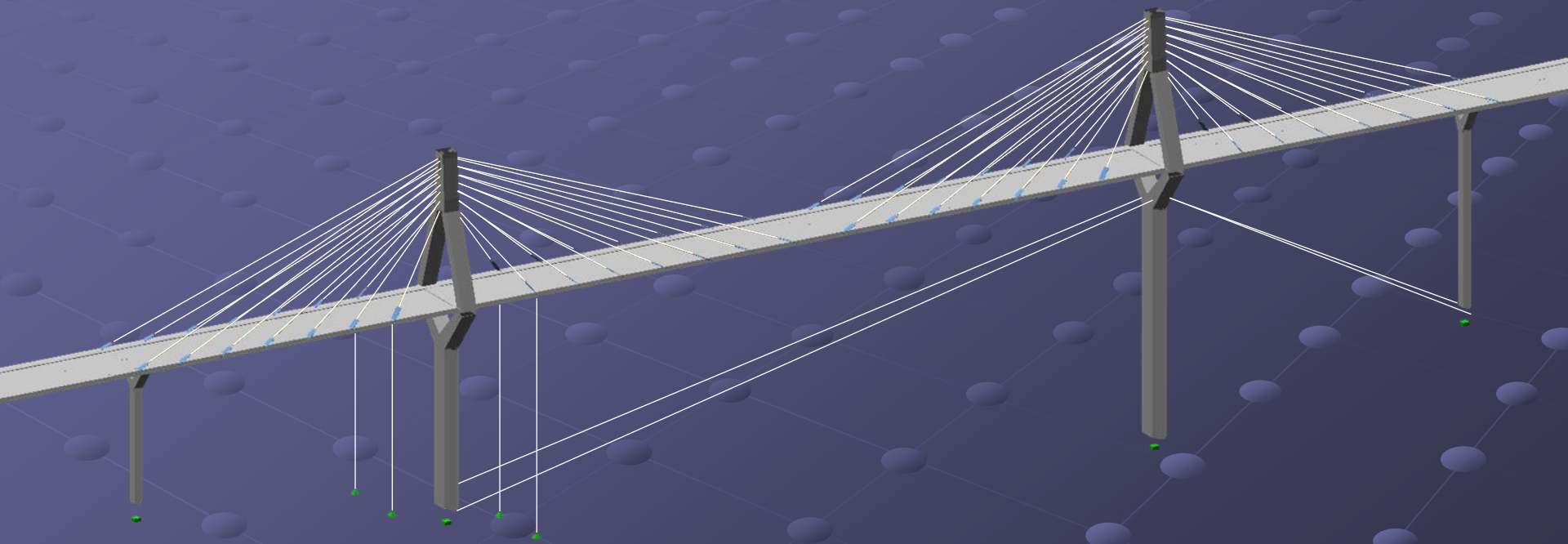


Projet Poya

Pont de la Poya - Procédé de montage



Système clavé

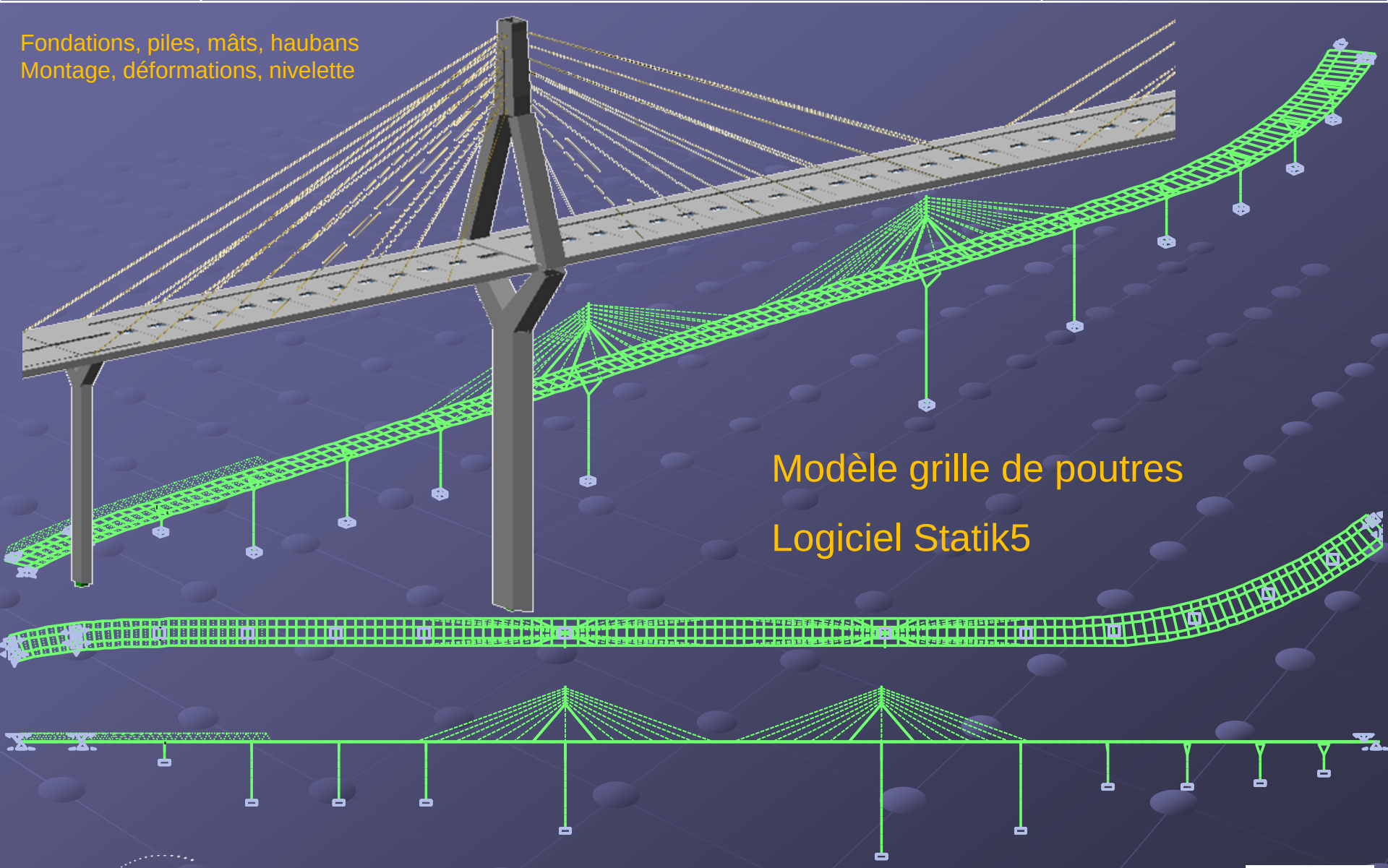


Projet Poya

Pont de la Poya - Procédé de montage

GIPP MPP

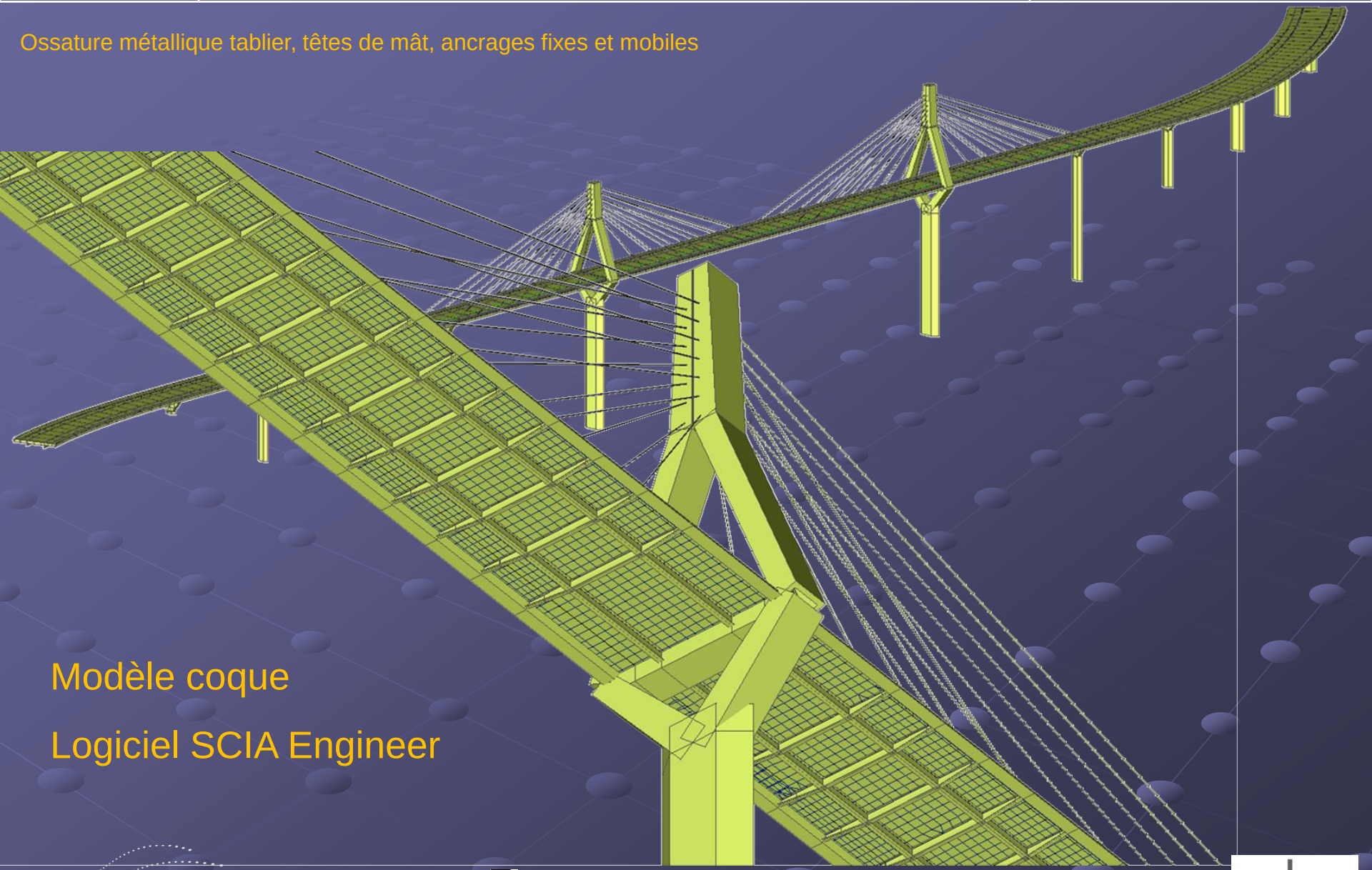
Fondations, piles, mâts, haubans
Montage, déformations, nivelette



Modèle grille de poutres

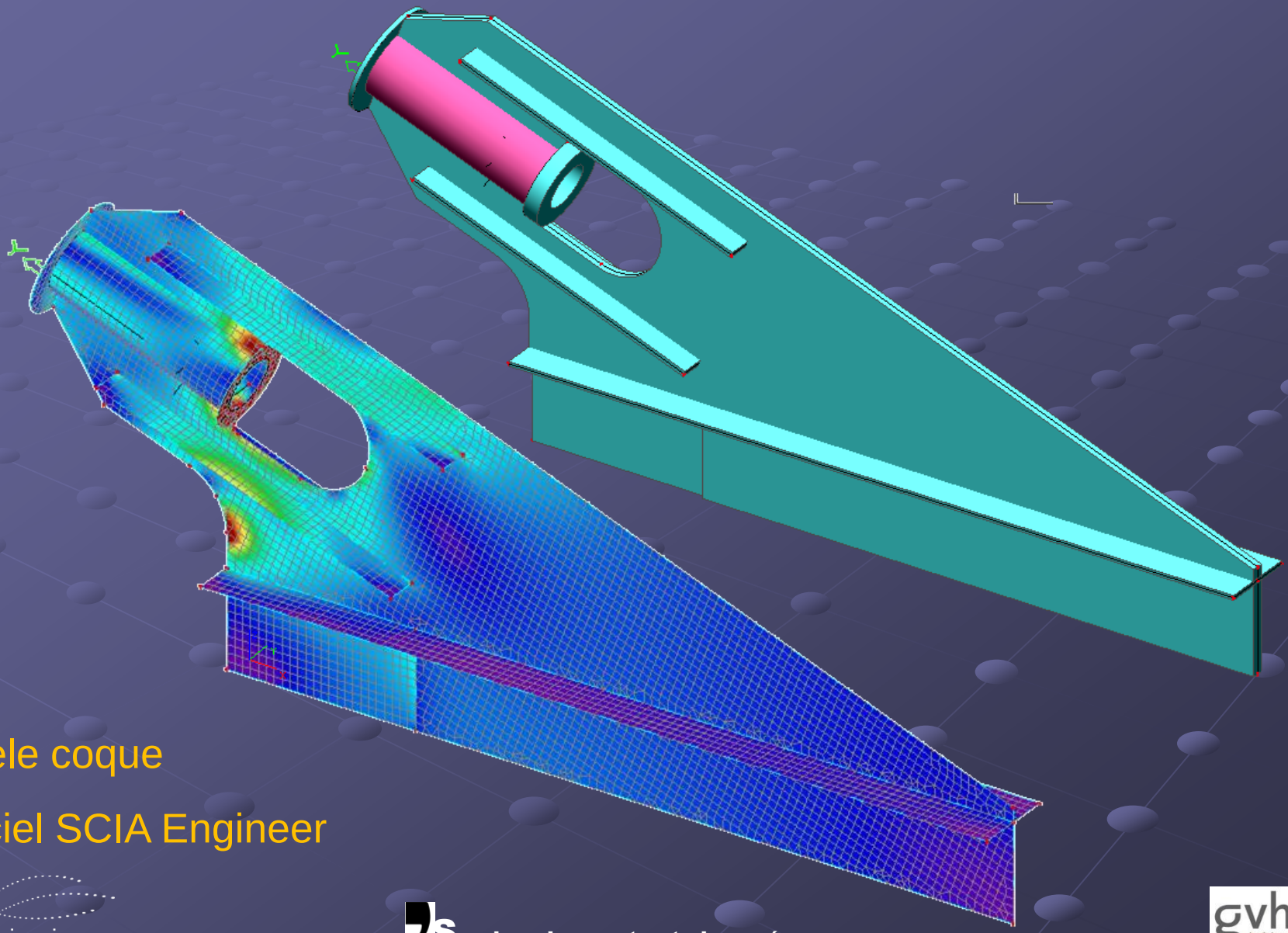
Logiciel Statik5

Ossature métallique tablier, têtes de mât, ancrages fixes et mobiles



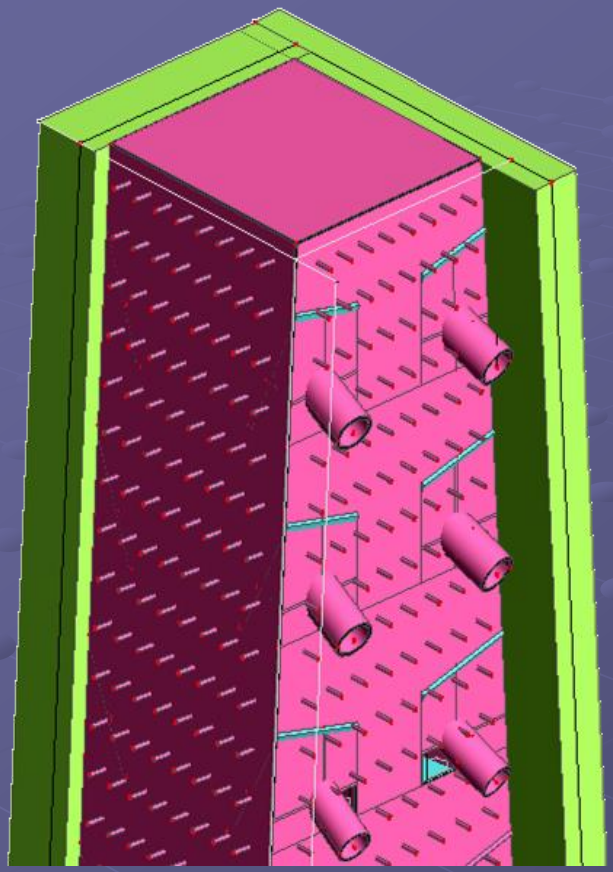
Modèle coque

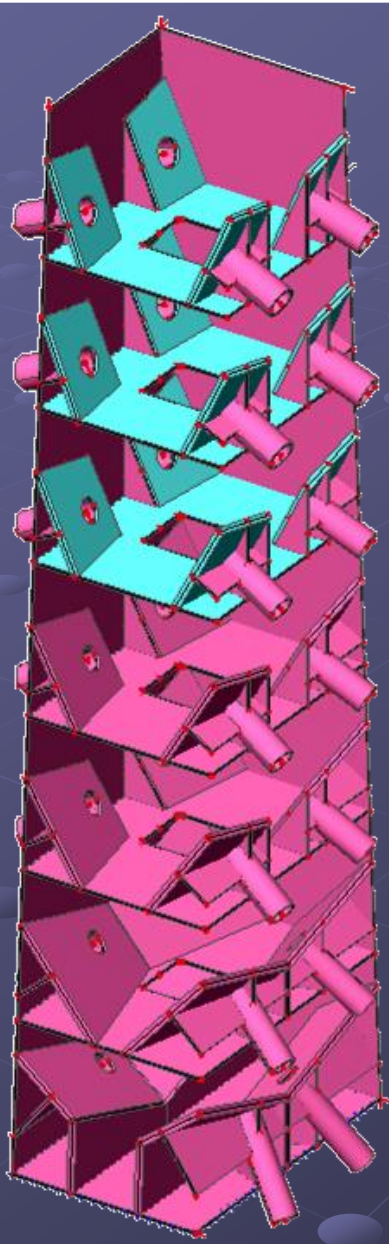
Logiciel SCIA Engineer

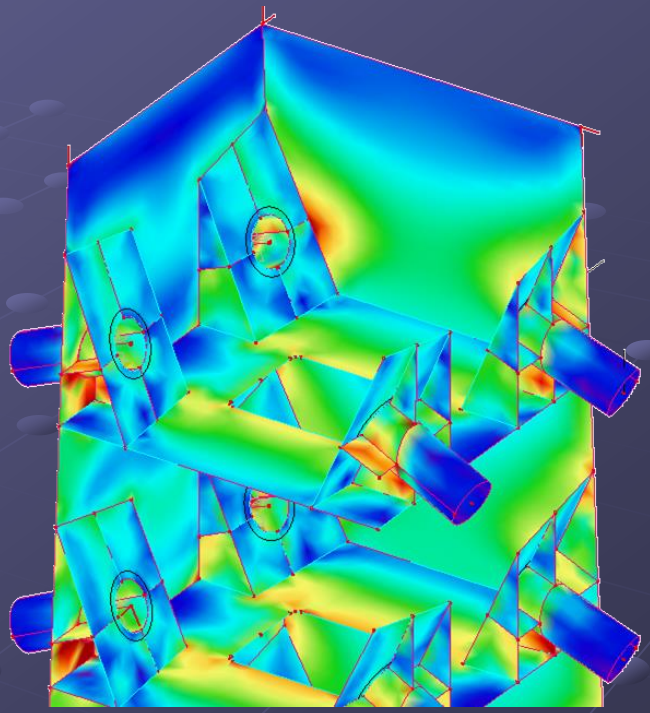


Modèle coque

Logiciel SCIA Engineer

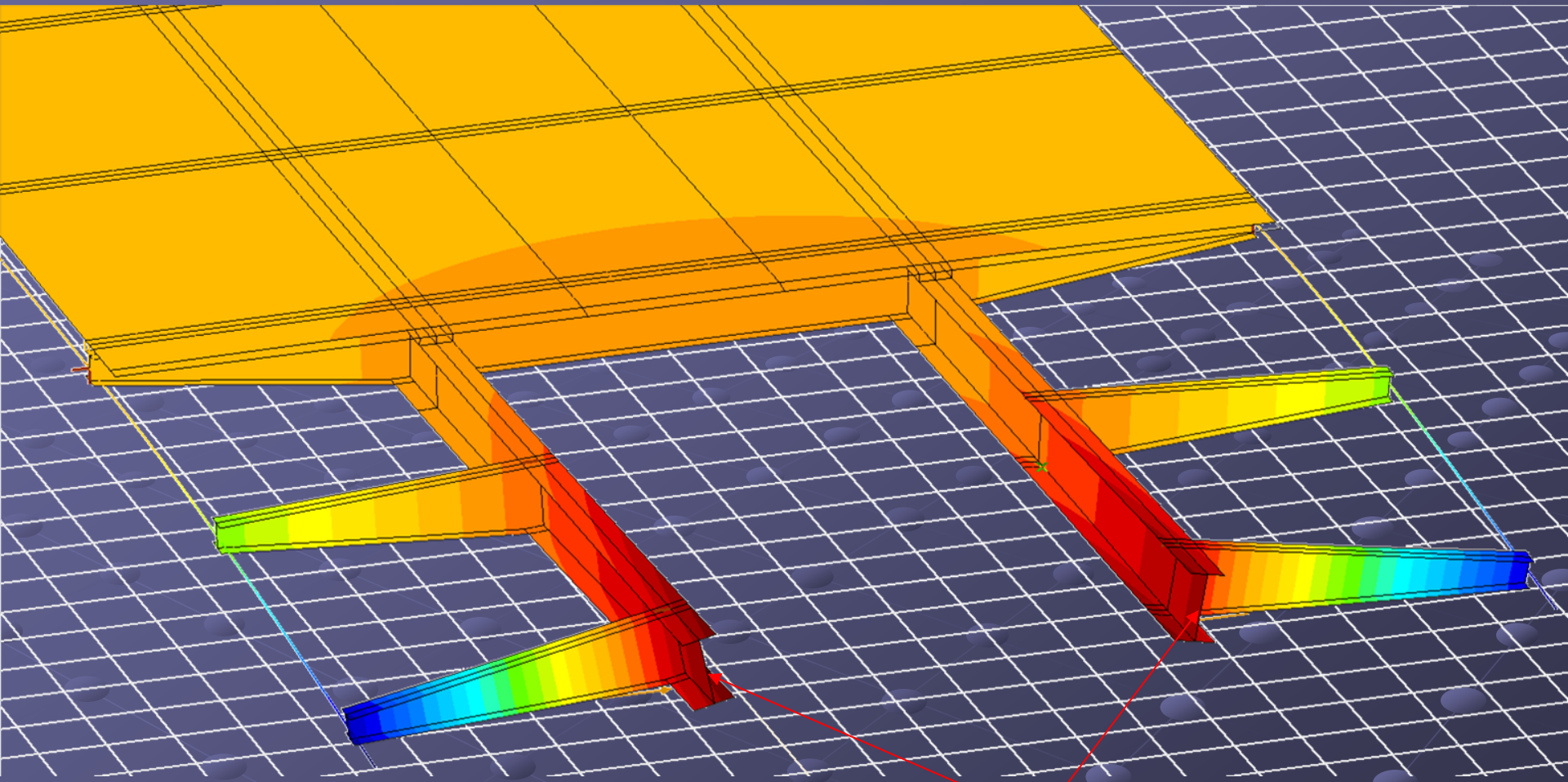






Modèle coque

Logiciel SCIA Engineer



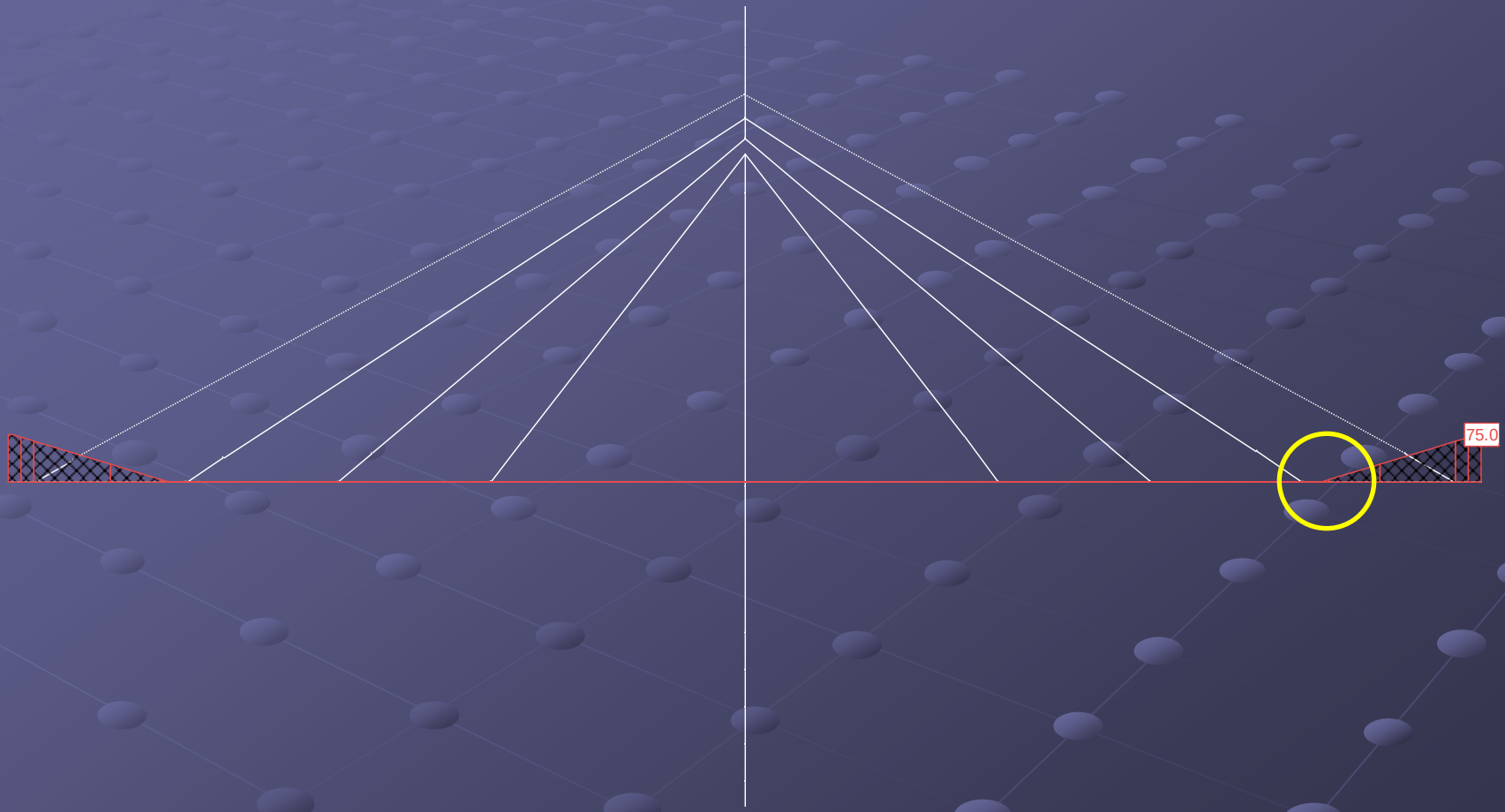
Modèle coque

Axis VM

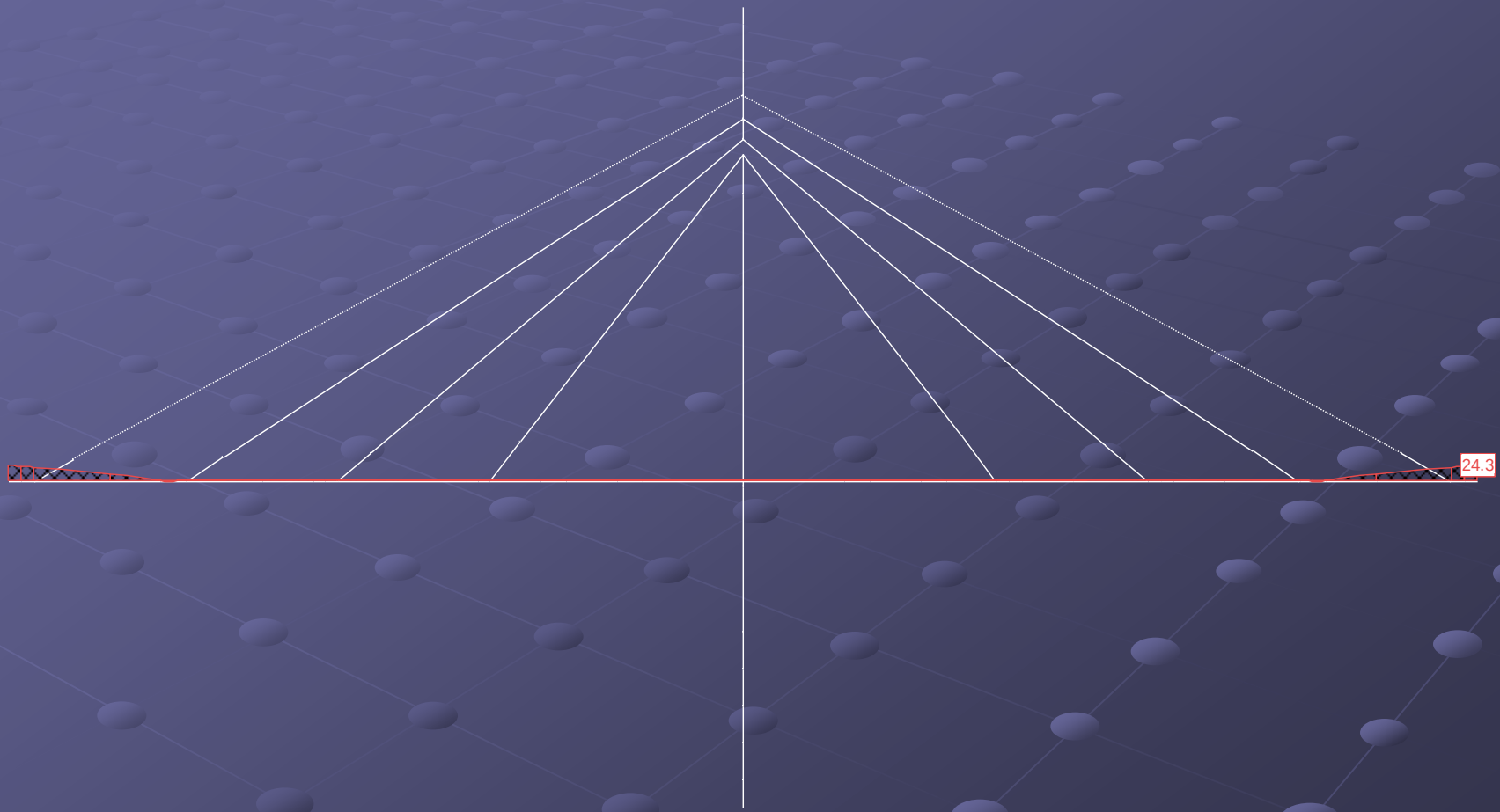
Contreflèche transversale

MONTAGE EN ENCORBELLEMENT

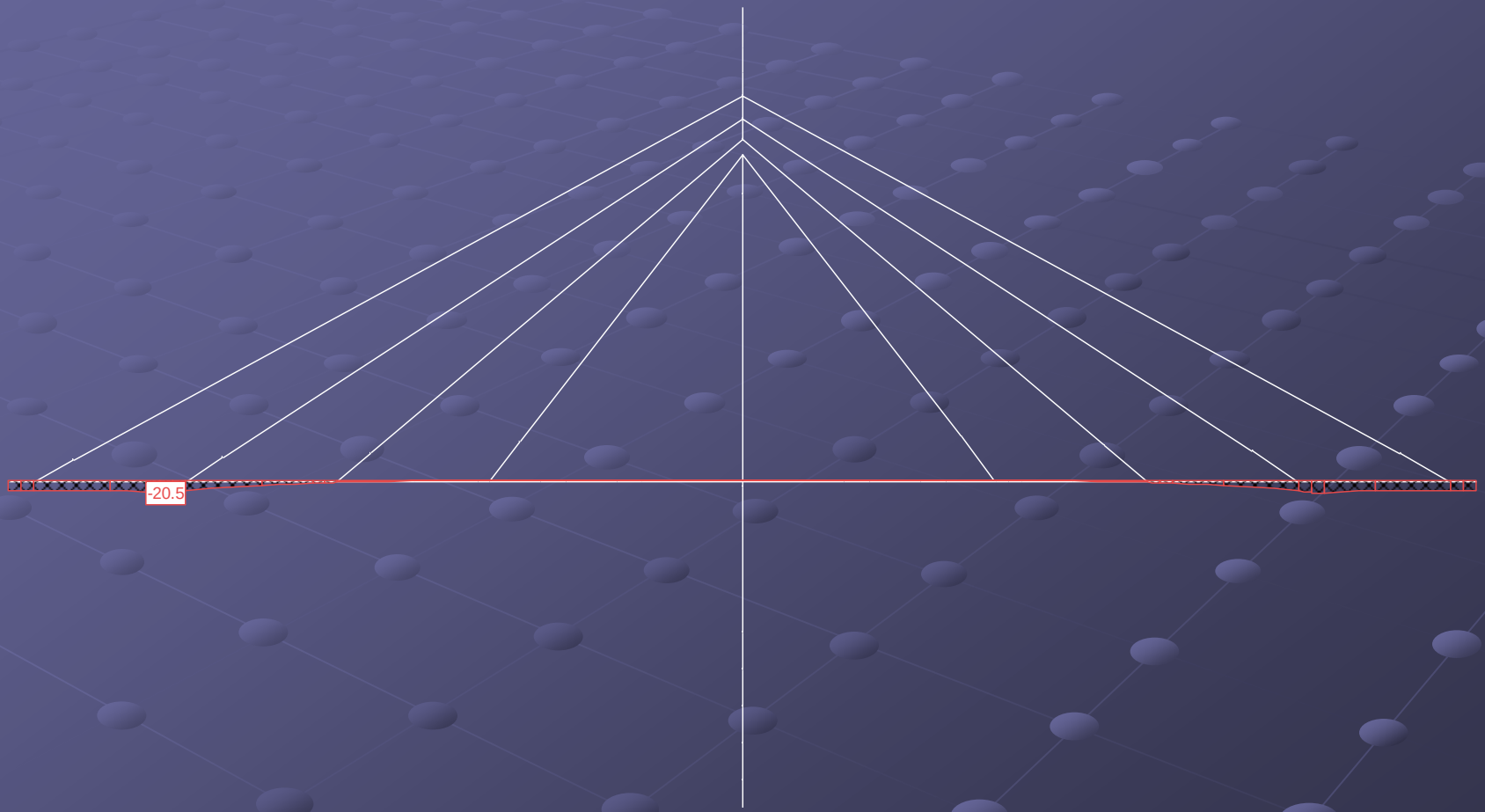
Procédure détaillée



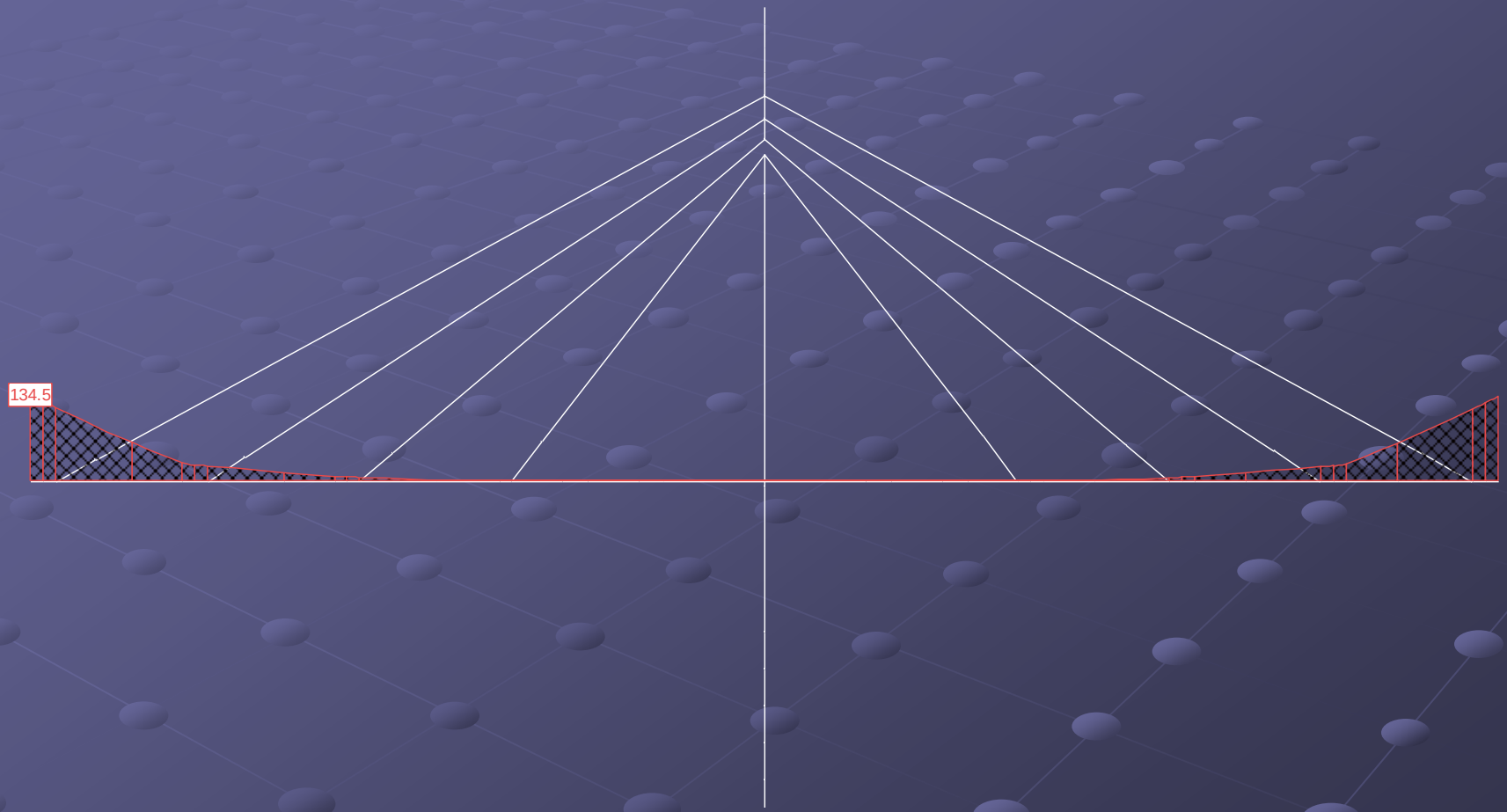
Rotation initiale au nez de l’étape précédente



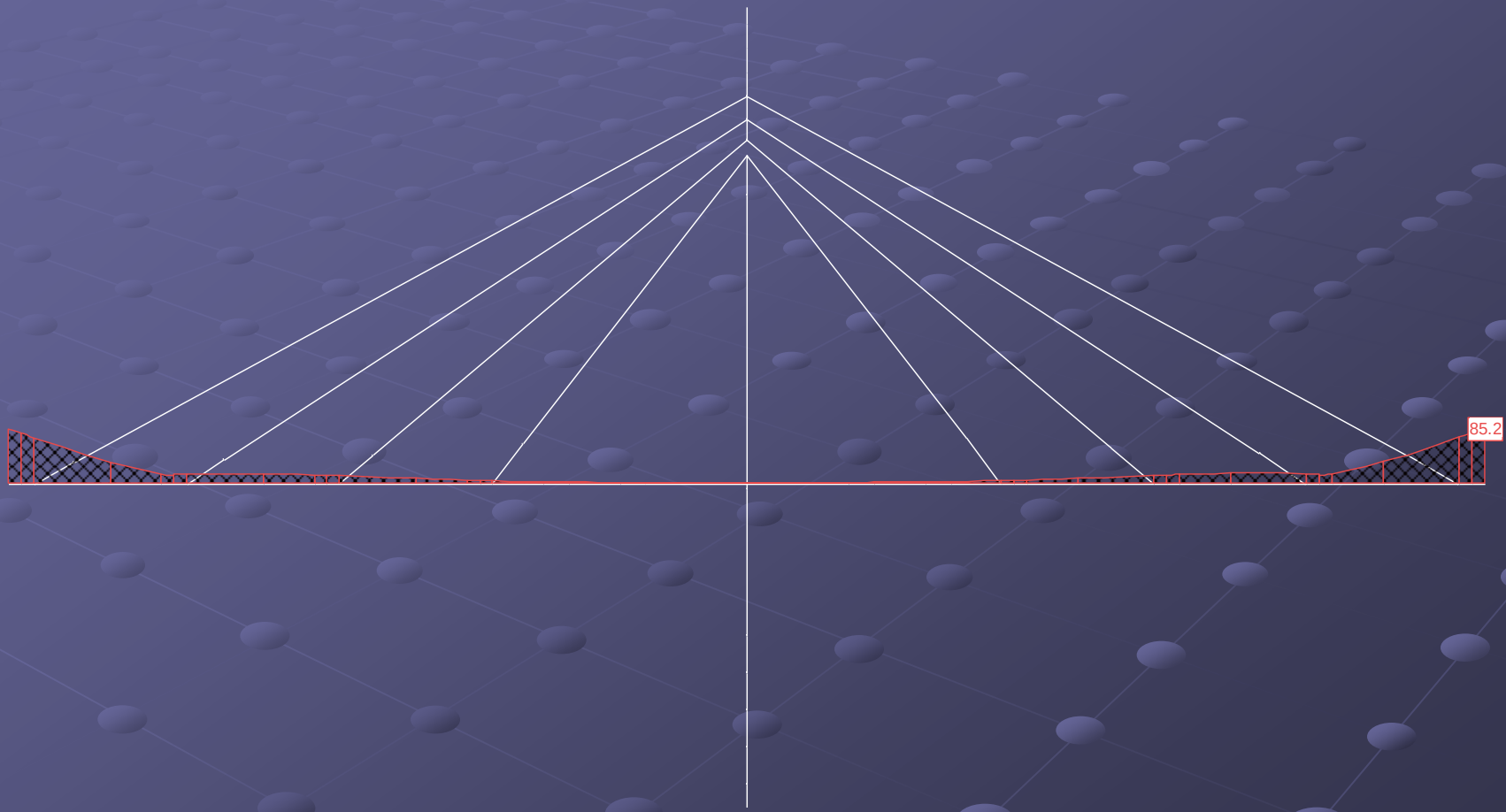
Pré-déformation transversale de l'ossature métallique



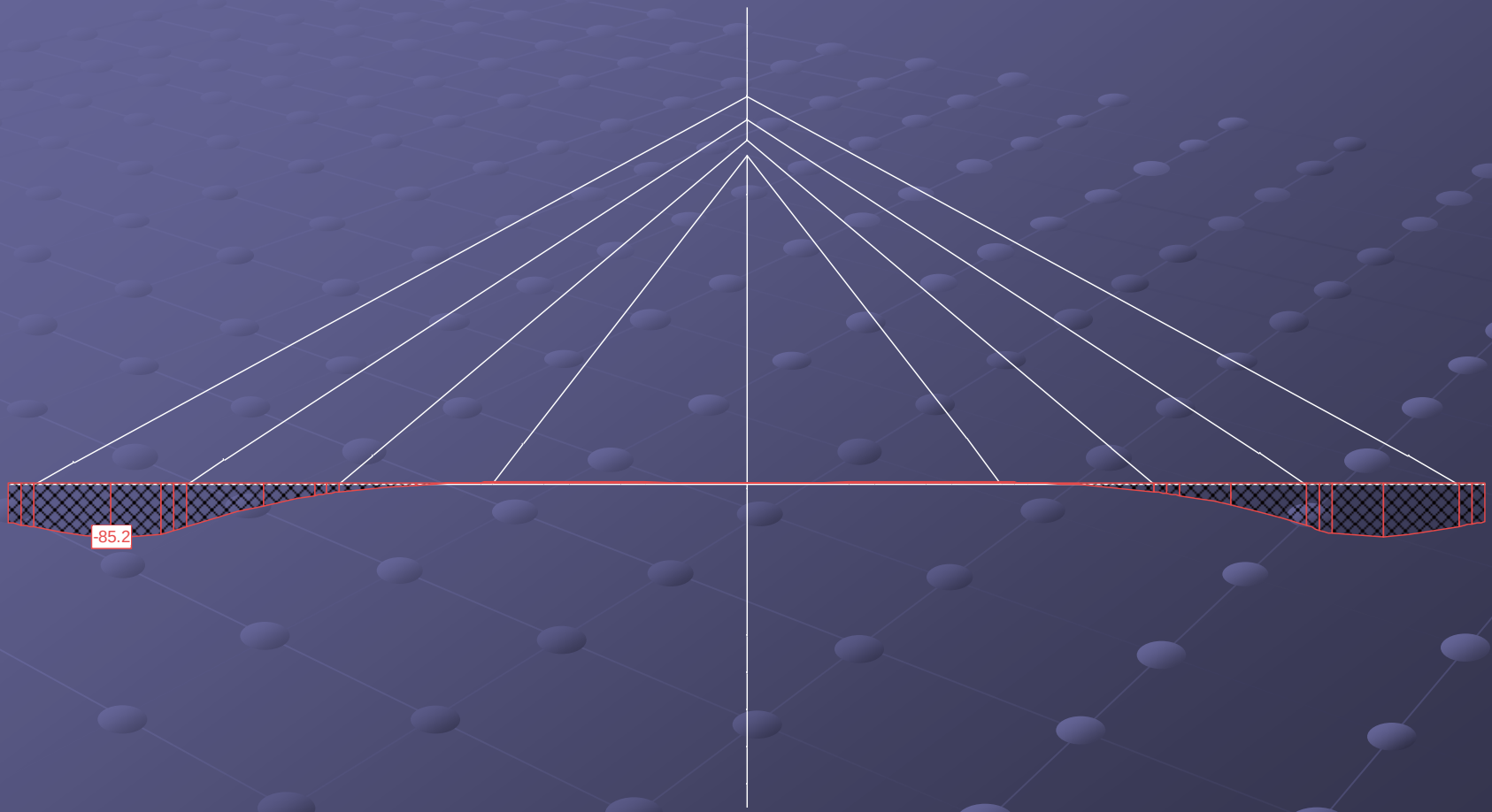
Poids propre de l'ossature métallique



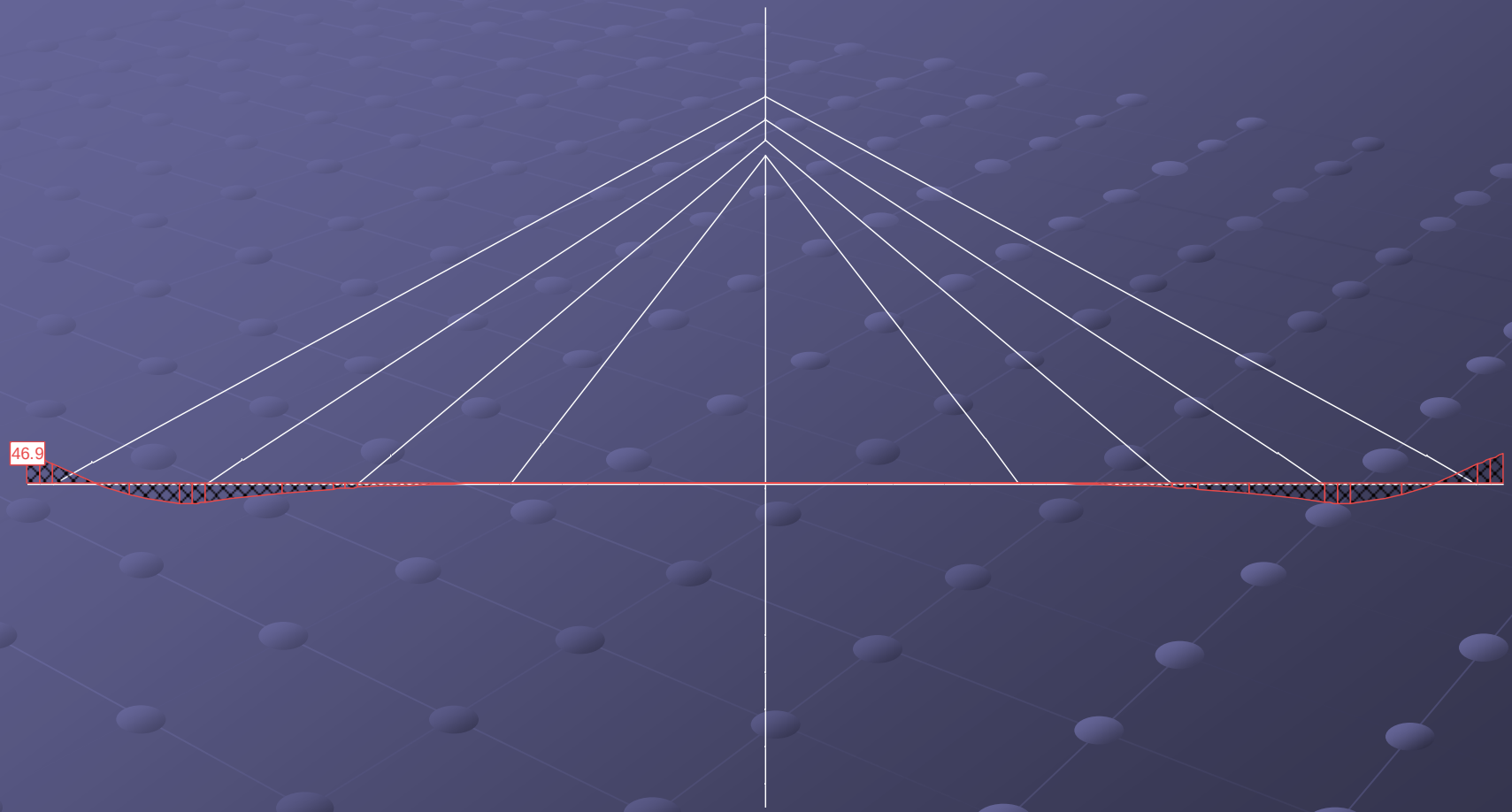
Première mise en tension des haubans



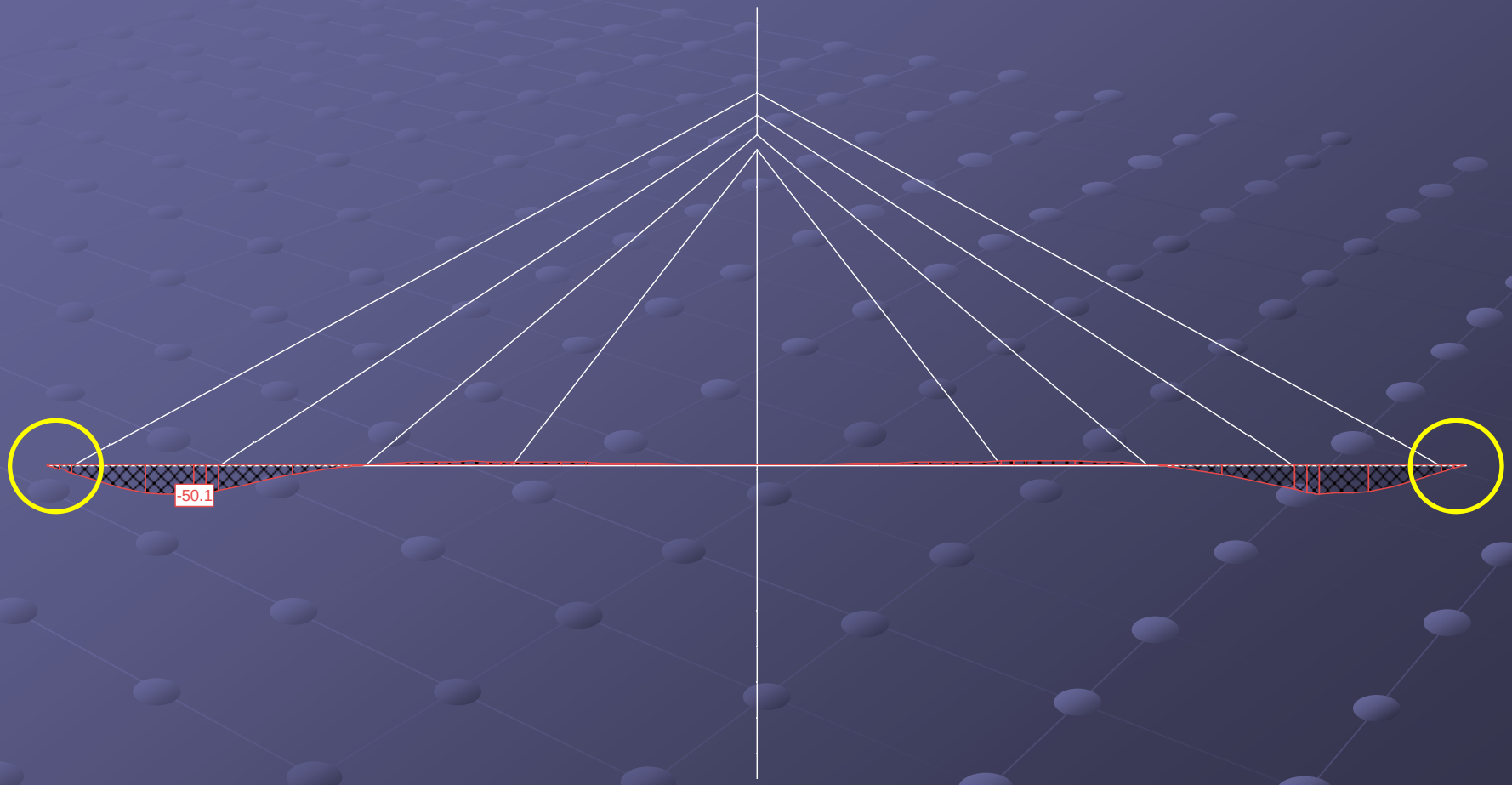
Déplacement du coffrage



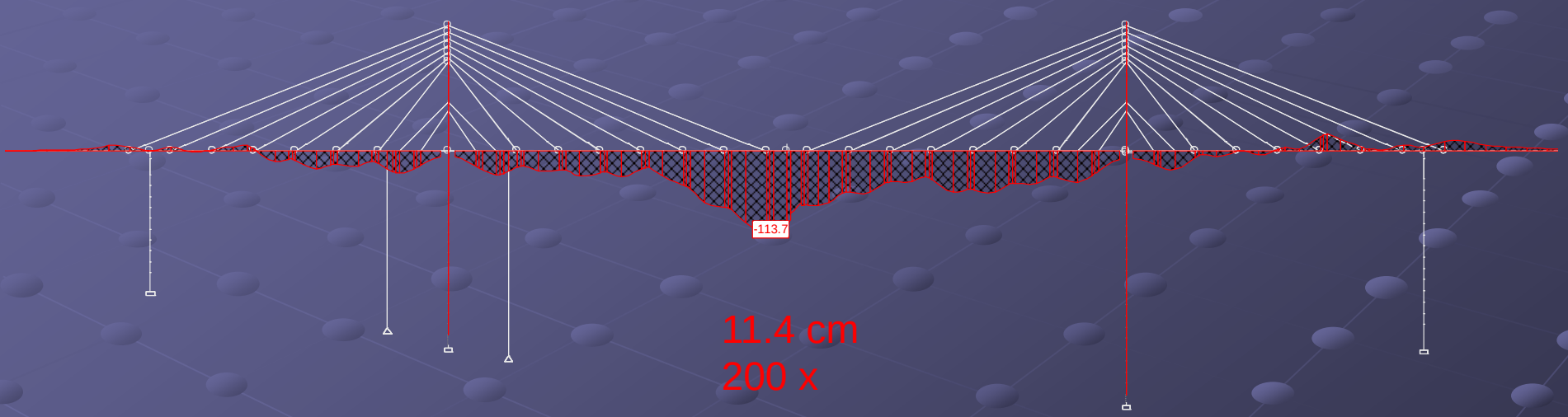
Bétonnage



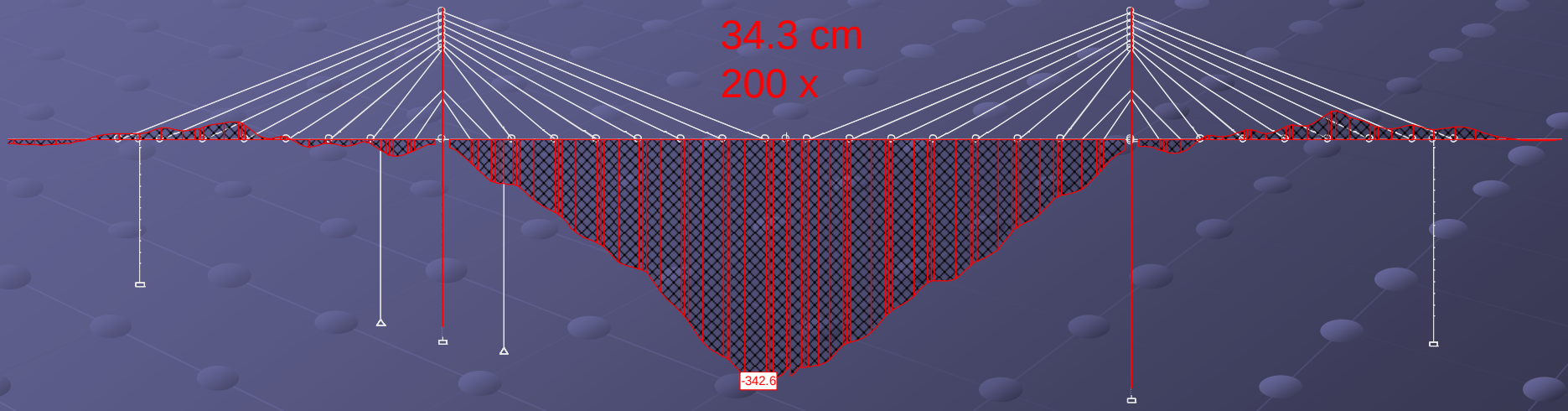
Deuxième mise en tension



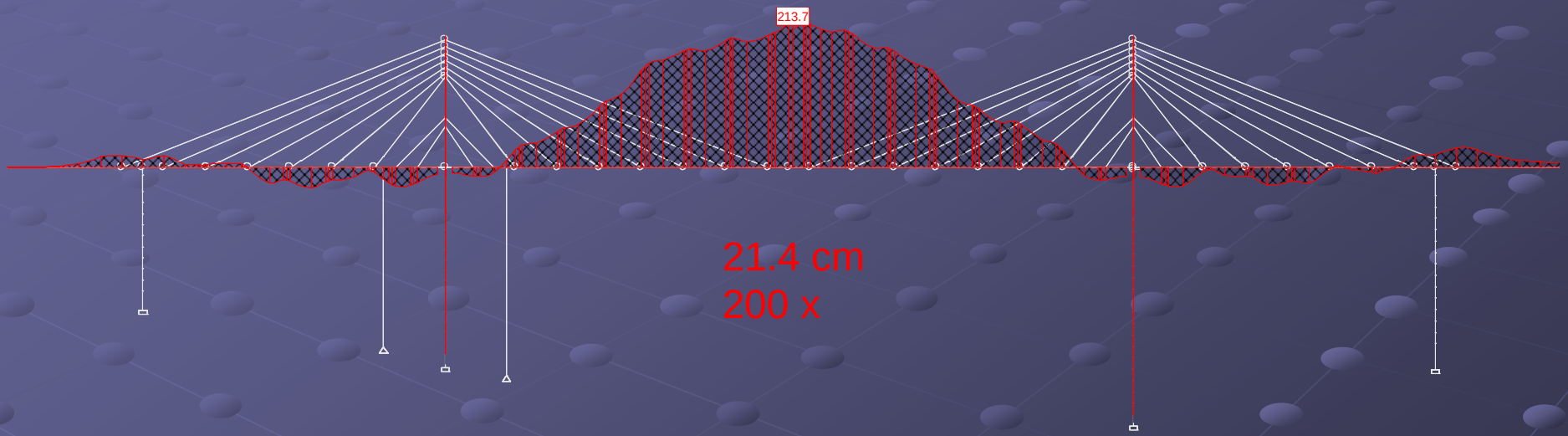
Déplacement de la plateforme et de la poutre de levage



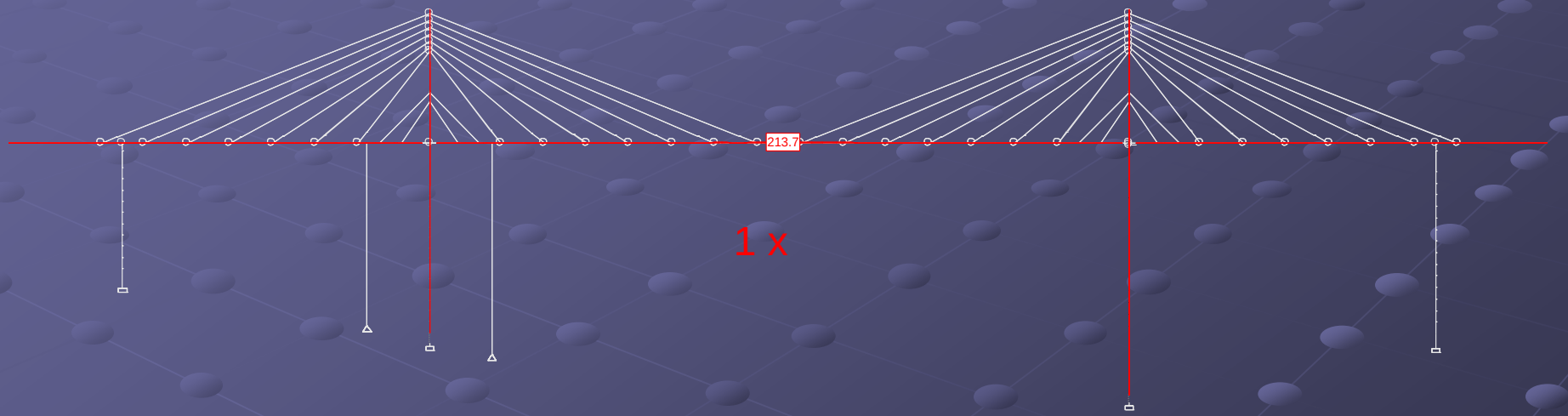
Etat après clavage de la travée centrale



Etat après mise en œuvre du revêtement

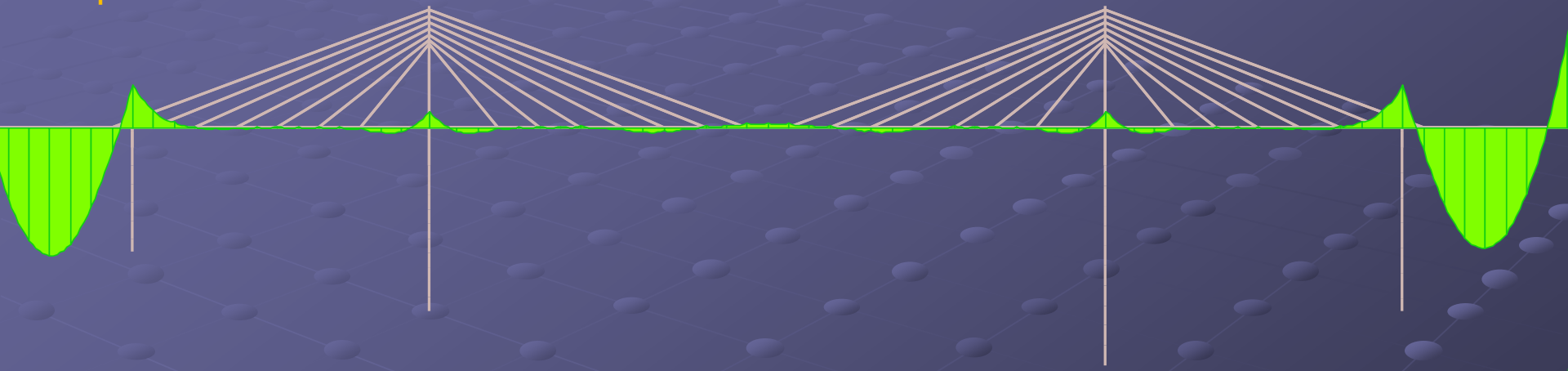


Troisième mise en tension

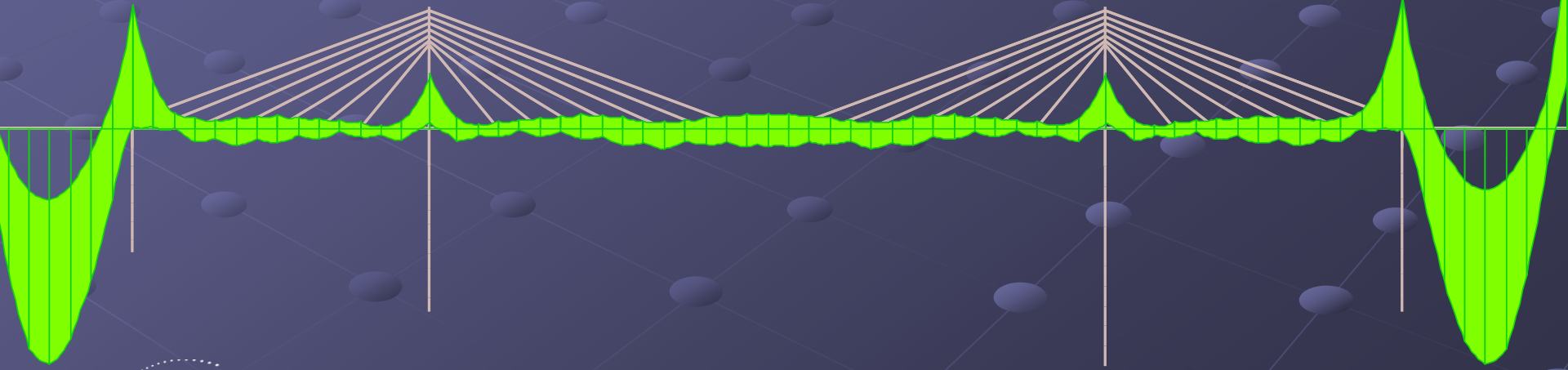

213.7
1 x

FLEXION LONGITUDINALE DU TABLIER

Etat permanent

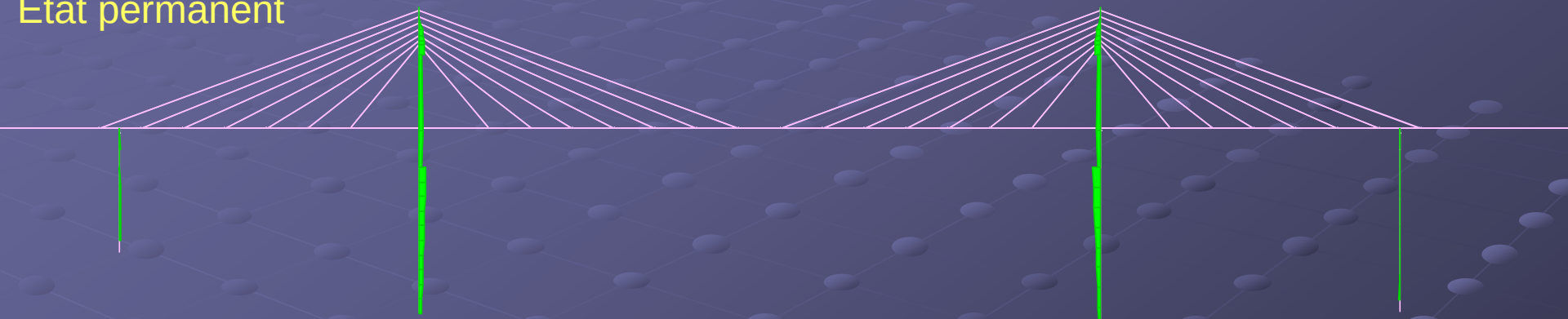


Enveloppe des moments de dimensionnement (trafic prépondérant)

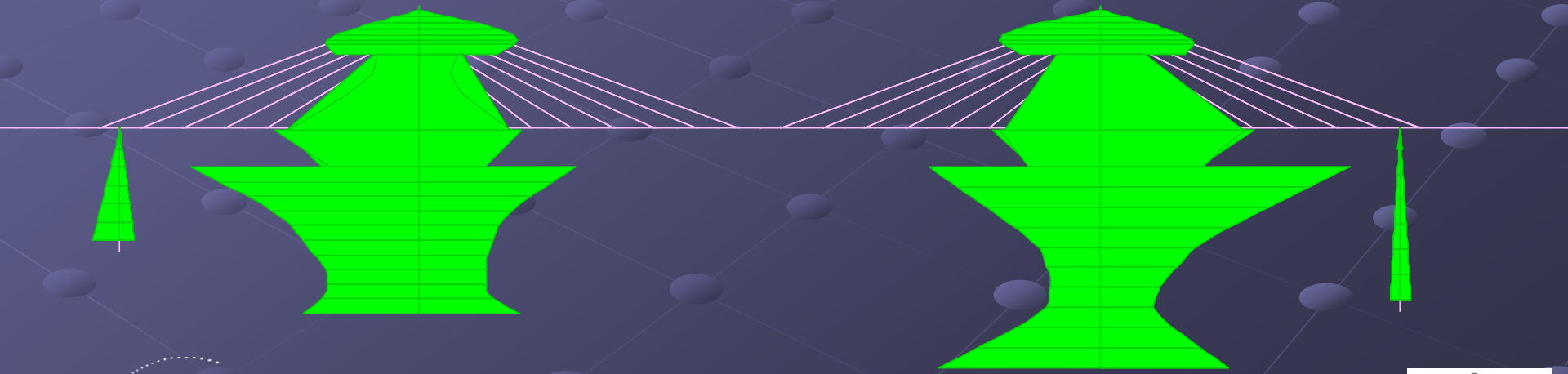


FLEXION LONGITUDINALE DES MATS

Etat permanent

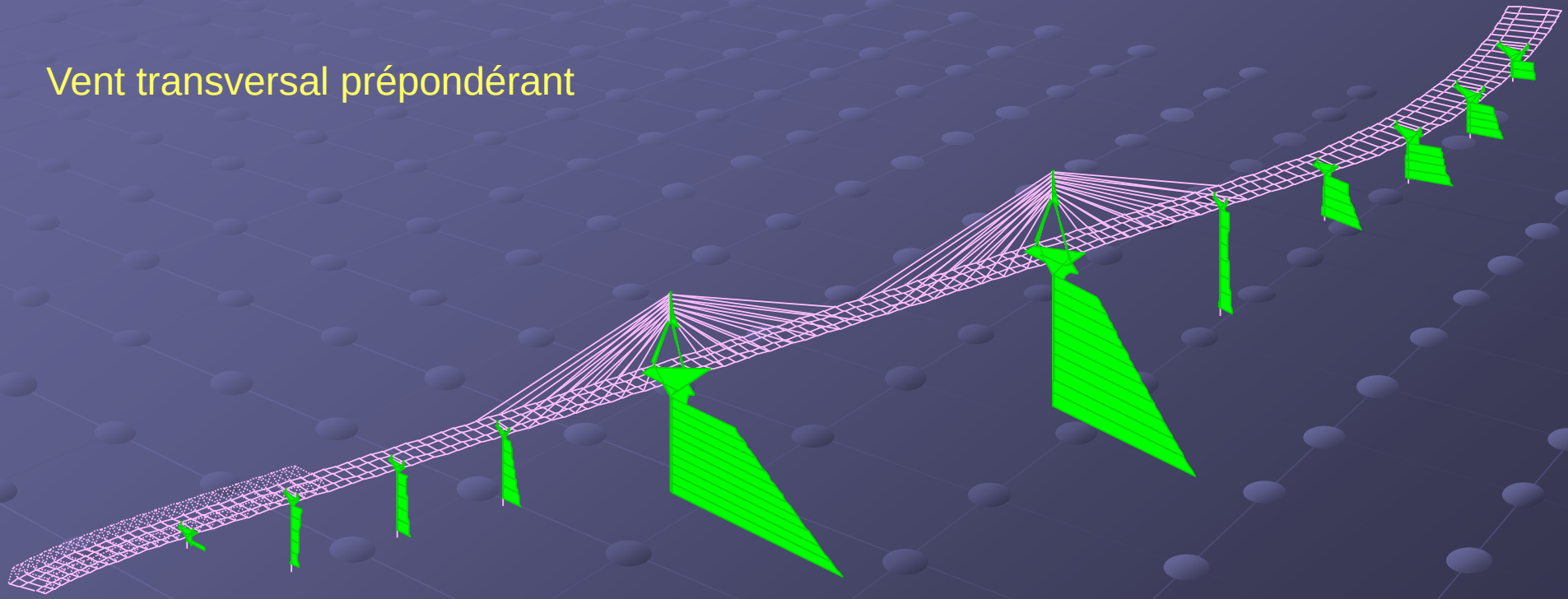


Enveloppe des moments de dimensionnement



FLEXION TRANSVERSALE

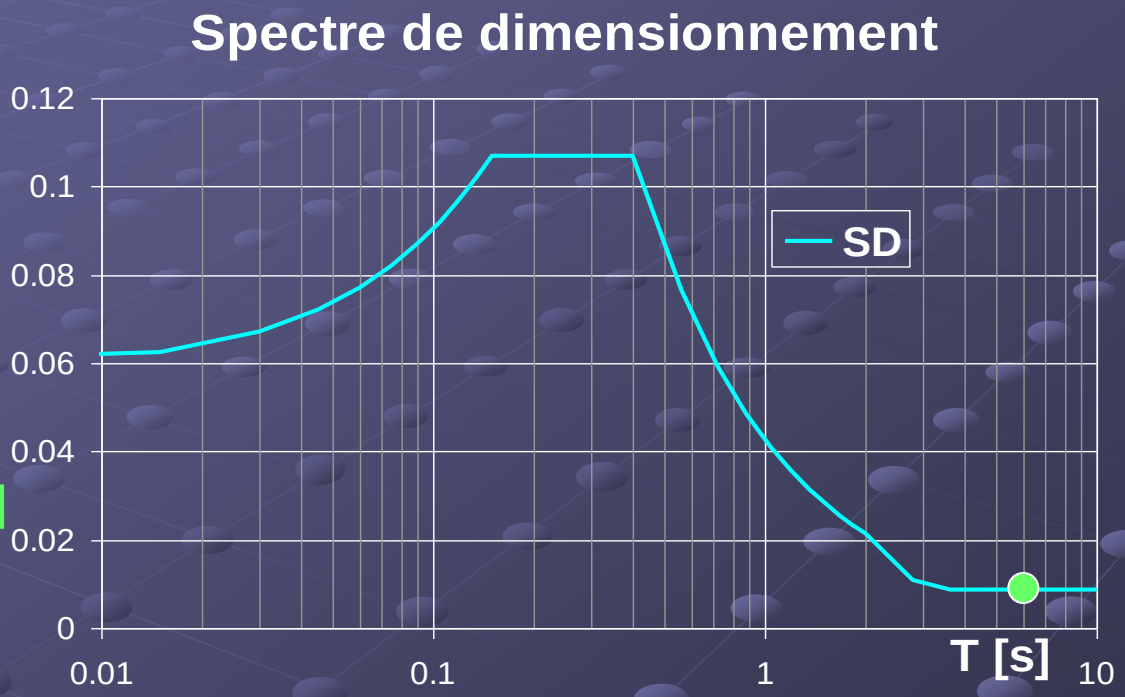
Vent transversal prépondérant



METHODE DES FORCES DE REMPLACEMENT
ACCELERATION LONGITUDINALE

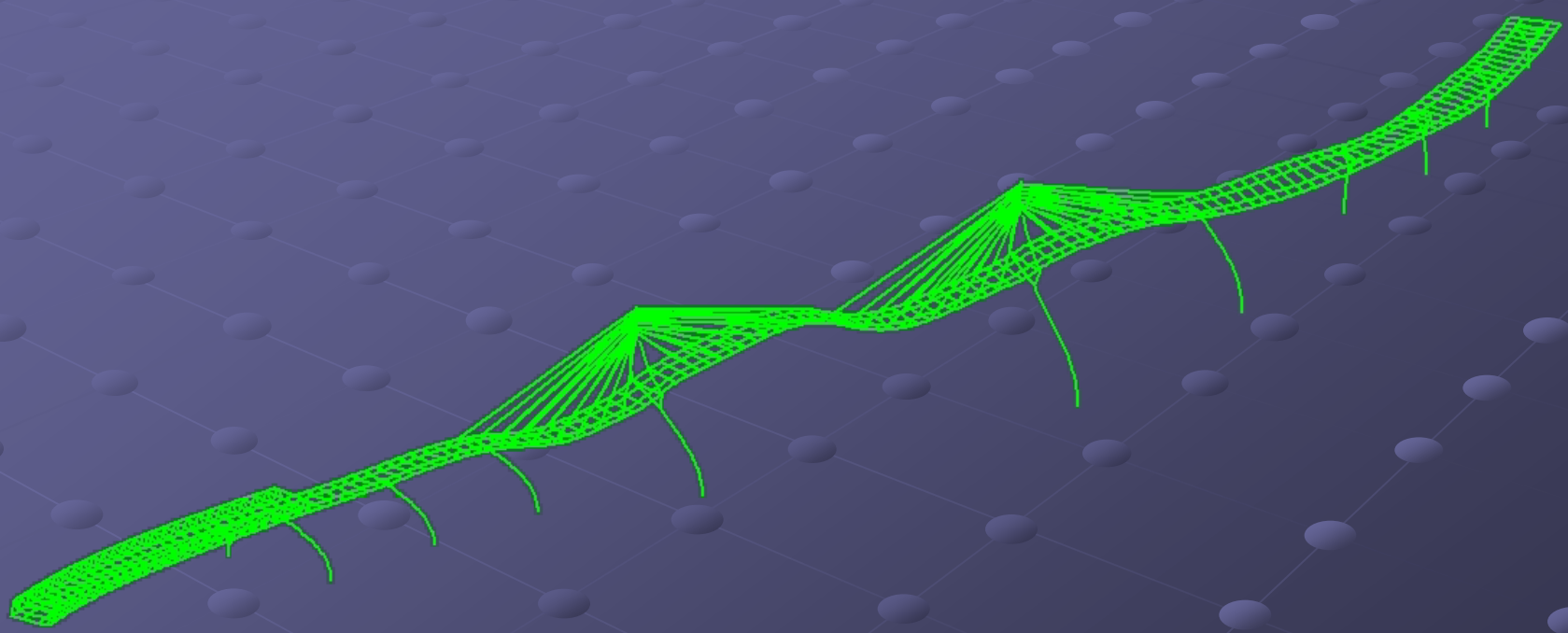
PARAMETRES SIA 261

Zone de séisme:	Z1
Classe du sol de fond.:	A
Classe d'ouvrage:	CO III
Coeff. de comportement:	q = 2.0
Période 1er mode:	5 [s]
Fréquence 1er mode:	0.20 [Hz]



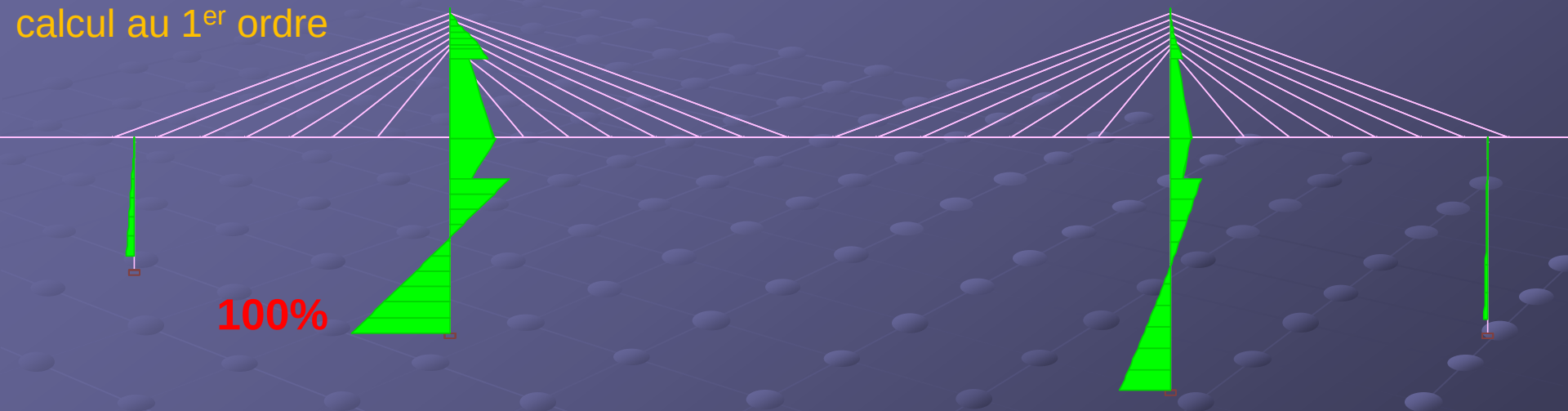
Valeur du spectre de dimensionnement pour le 1er mode: $S_d = 1 / 117$

Force longitudinale de remplacement: $\gamma_x = 25 / 117 = 0.225$ kN/m^3

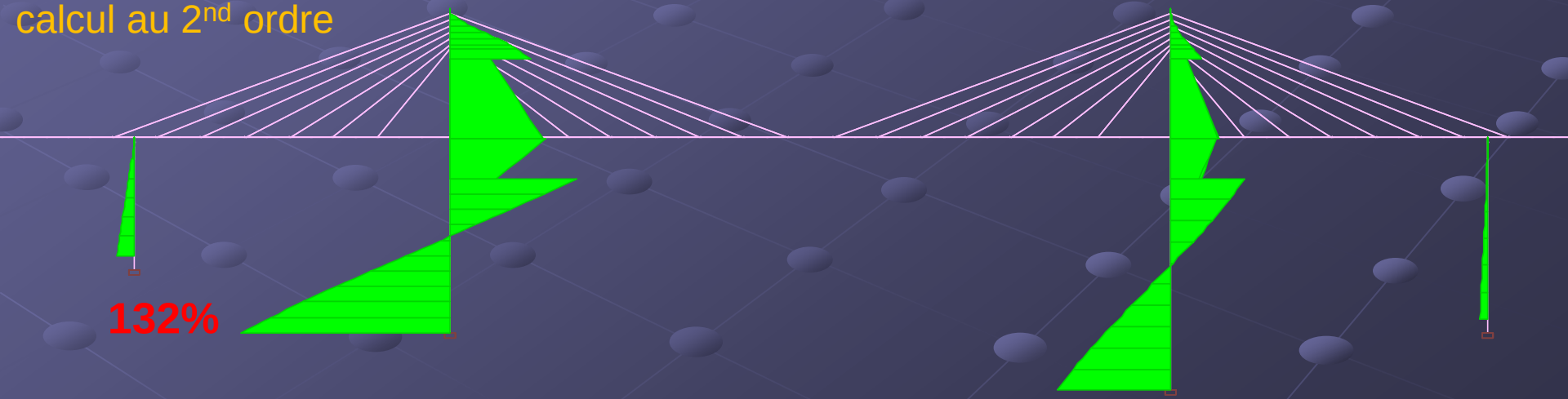


SEISME – FLEXION DES MATS

calcul au 1er ordre



calcul au 2nd ordre



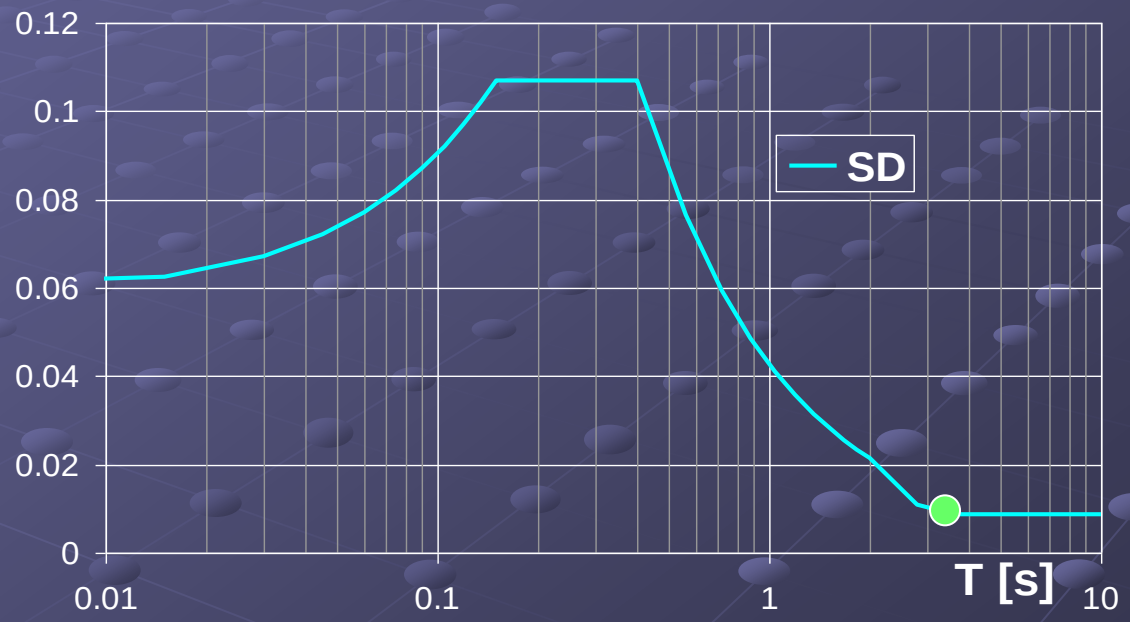
METHODE DES FORCES DE REMPLACEMENT
ACCELERATION TRANSVERSALE

PARAMETRES SIA 261

Zone de séisme: Z1
Classe du sol de fond.: A
Classe d'ouvrage: CO III
Coeff. de comportement: q = 2.0

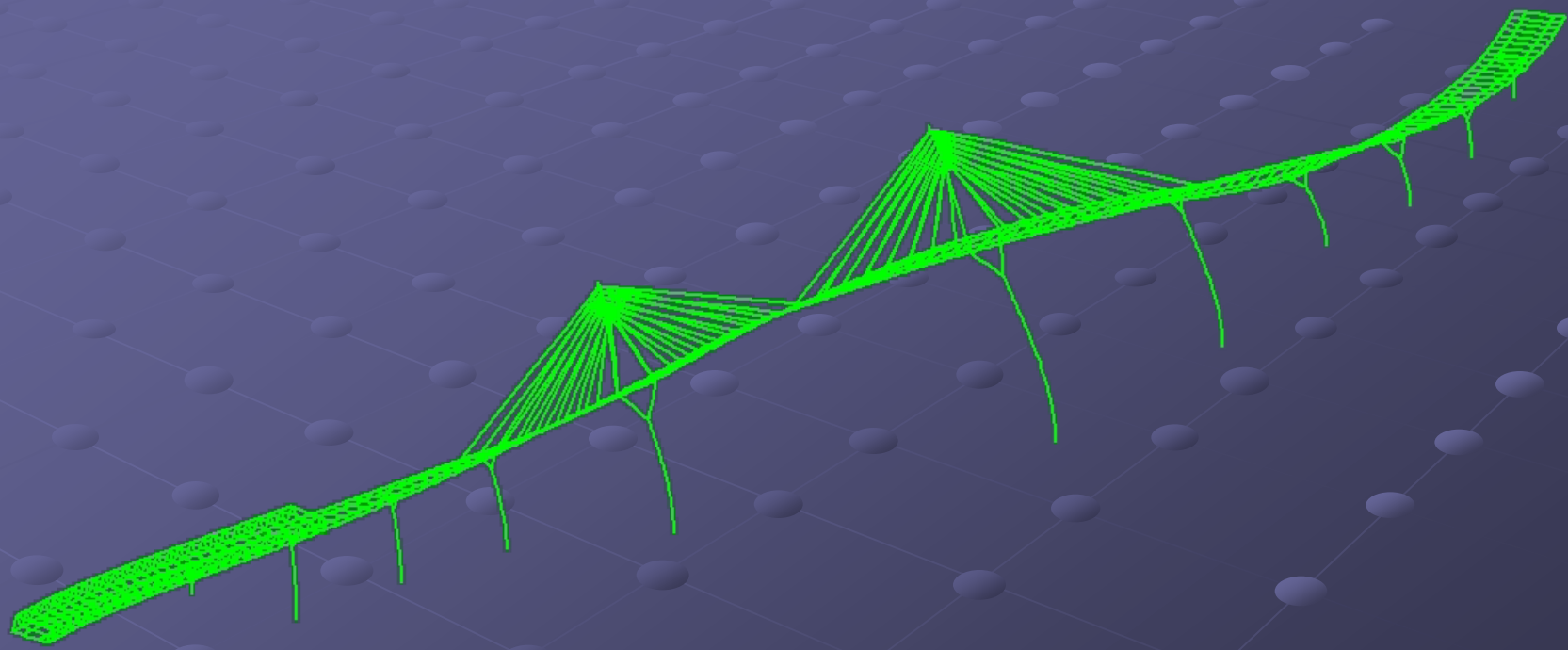
Période 2ème mode: 3.13 [s]
Fréquence 2ème mode: 0.32 [Hz]

Spectre de dimensionnement

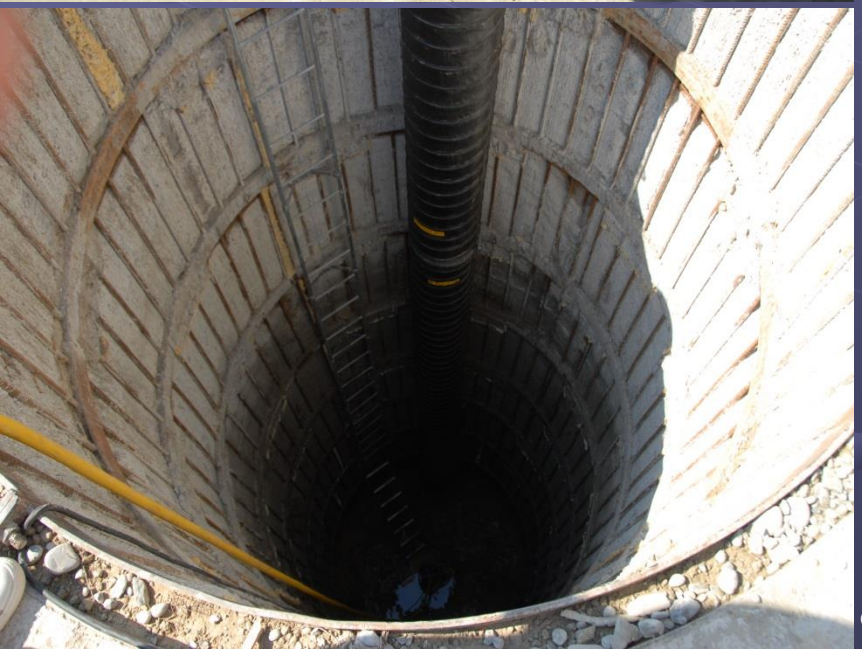


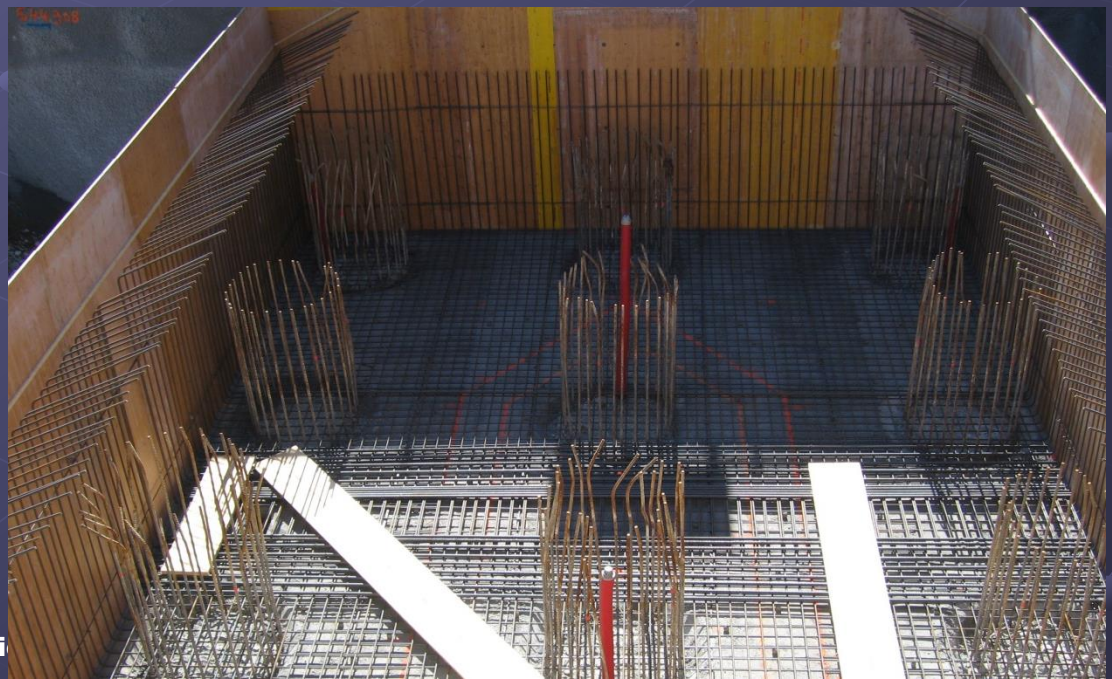
Valeur du spectre de dimensionnement pour le 2e mode: Sd = 1 / 114

Accélération transversale de remplacement: $\gamma_y = 25 / 114 = 0.22$ kN/m^3

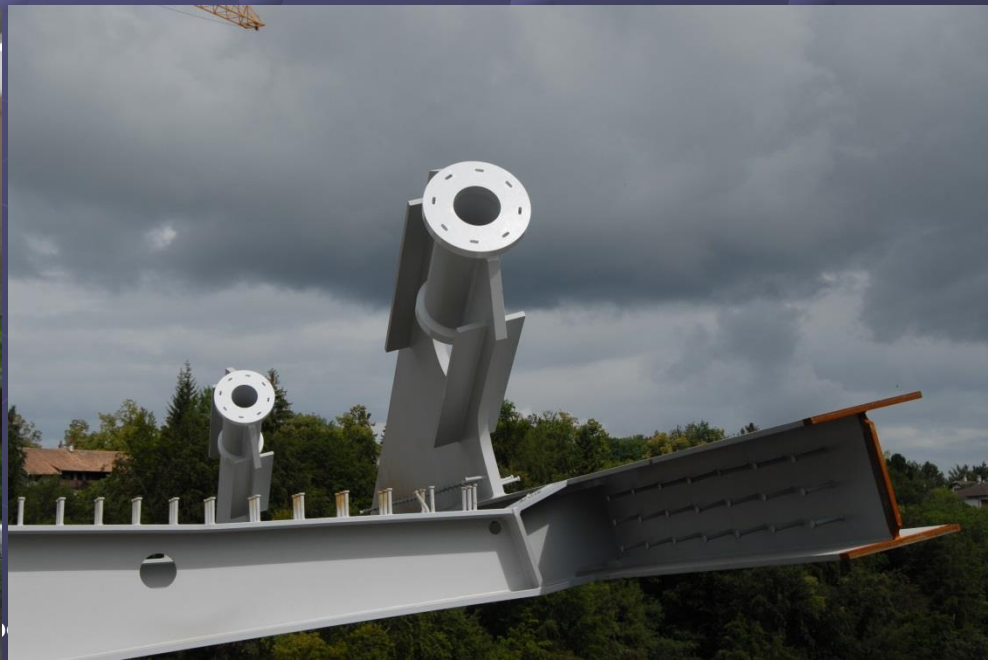



P5

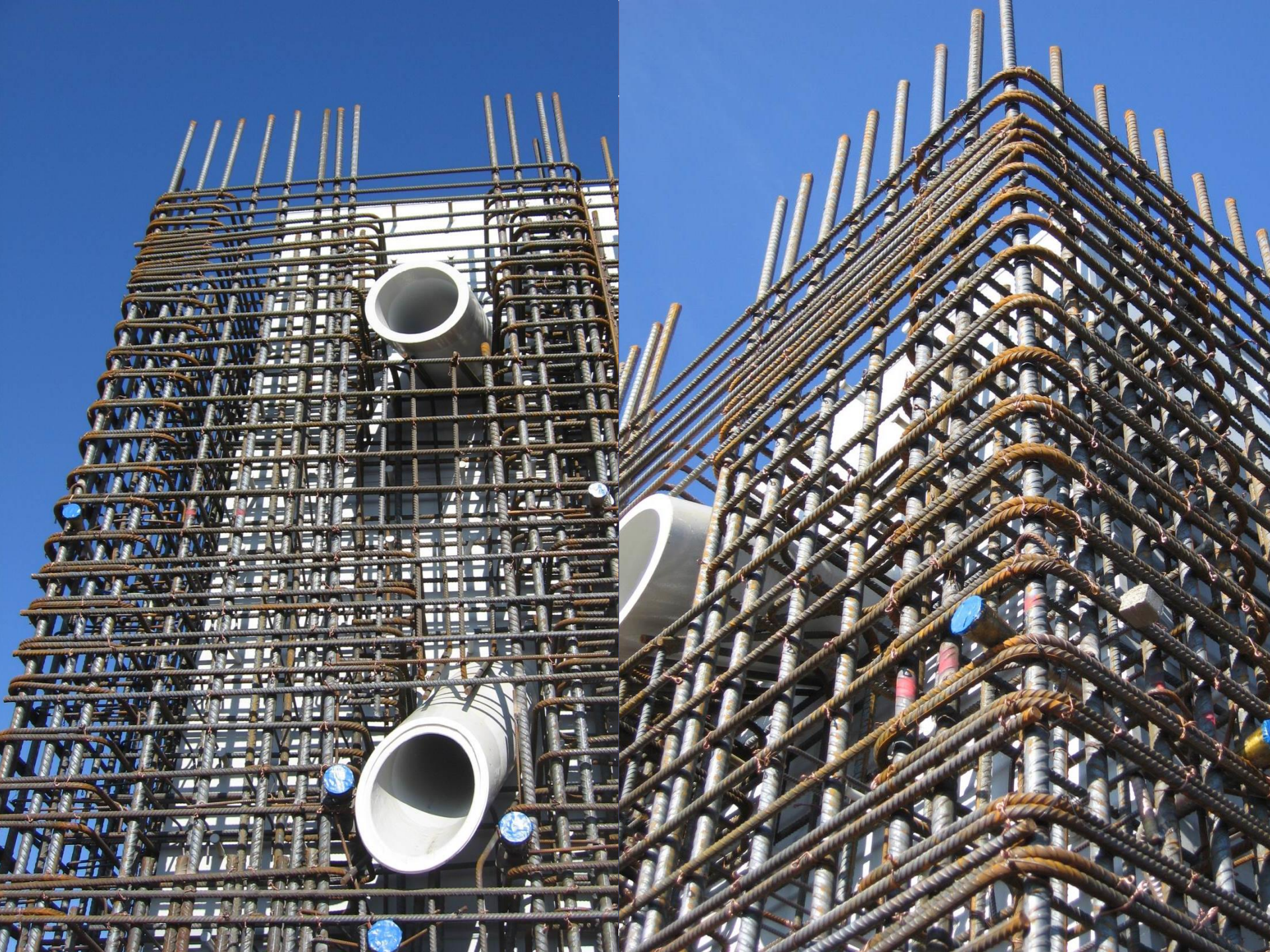





Metallux
METAFLON
5
55




roth échafaudages
au service de la beauté




ZM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Stabilisation provisoire


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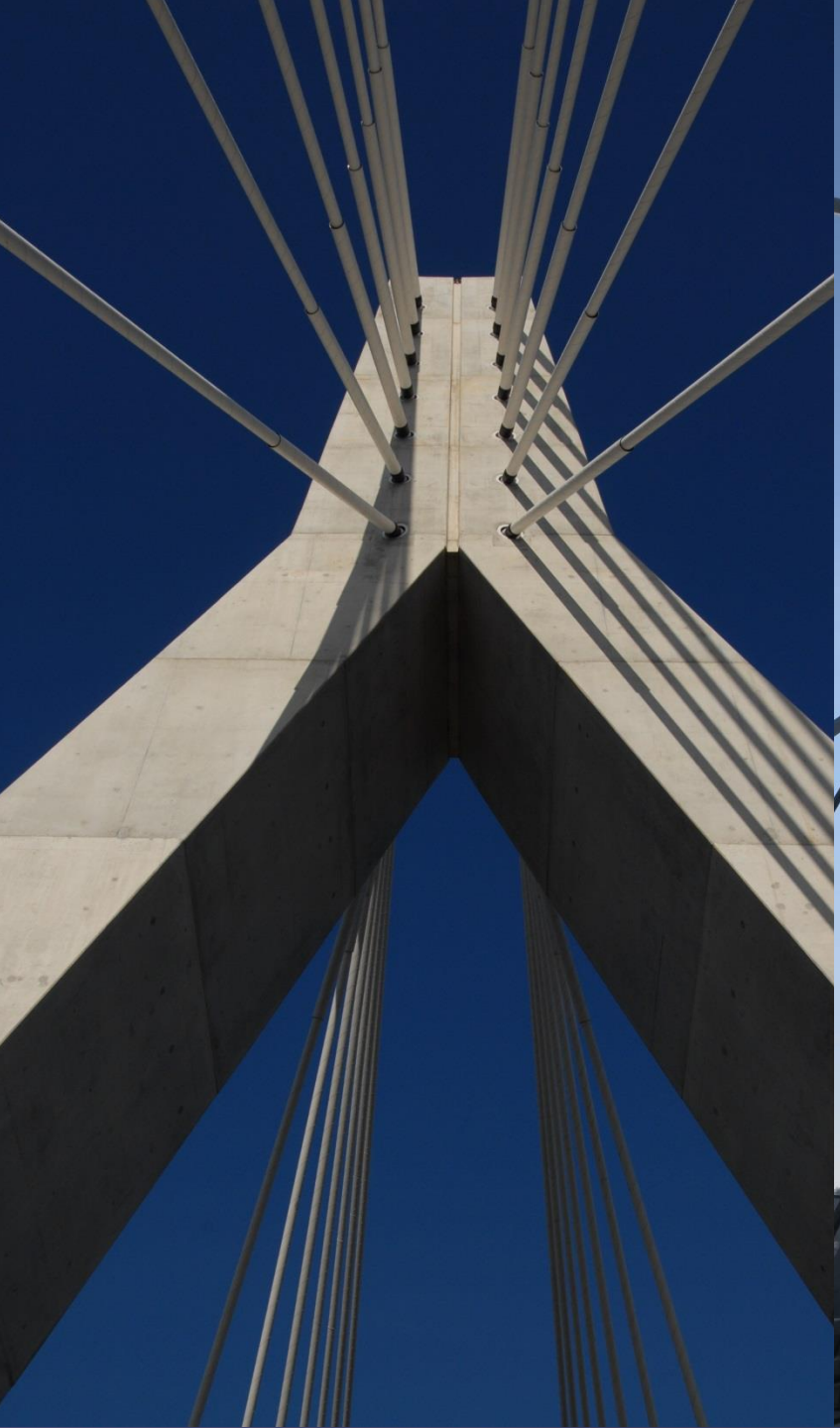


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