RESULTS COMPARISON

CDS-SectionDesigner / Cubs-Fagus

ANALYSIS 1 – Prestressed Concrete

CUBUS-FAGUS

Analyse des contraintes sous effort

Sollicitations

No	AP	P	Flexion et effort normal N [kN]	M_y [kNm]	M_z [kNm]	Effort tranchant et torsion V_y [kN]	V_z [kN]	T [kNm]	Remarques -
1	!ELU		0	2000.0	0				

Paramètres d'analyse "!ELU" Norme: Eurocode EN

Contraintes et dilatations extrêmes

Nom	Classe	y_q [m]	z_q [m]	ε [‰]	σ_d [N/mm²]	γ [-]
C1	C40/50	-1.427	0.	-0.19	-4.107	1.76
C1	C40/50	4.5	2.5	0.03	0.	1.76
P46	B500B	-1.392	0.05	-0.19	-37.189	1.15
P32	B500B	4.	2.45	0.02	4.285	1.15
PP1	S1500/1670	-1.36	0.15	4.95	965.372	1.15
PP5	S1500/1670	1.3	0.15	4.95	965.557	1.15

Contraintes calculées dans la section homogène (matériau linéaire)

Nom	Pondération	y_q [m]	z_q [m]	σ_{elas} [N/mm²]
C1	1.	-1.427	0.	-4.399
C1	1.	4.5	2.5	0.362

État au dernier pas d'itération

Efforts intérieurs N [kN]	M_y [kNm]	M_z [kNm]	Élongation et courbures ε_κ [‰]	χ_y [km⁻¹]	χ_z [km⁻¹]	Rigidités N/ε_κ [kN]	M_y/χ_y [kNm²]	M_z/χ_z [kNm²]
-1.2	2001.2	0.1	-0.04	-0.1	-0.0	26532.16	23378059.5	240452.59

Forces de précontrainte P(t=o) au début du chargement

N_p [kN]	M_{yp} [kNm]	M_{zp} [kNm]
-6279.7	-9706.5	-75.4

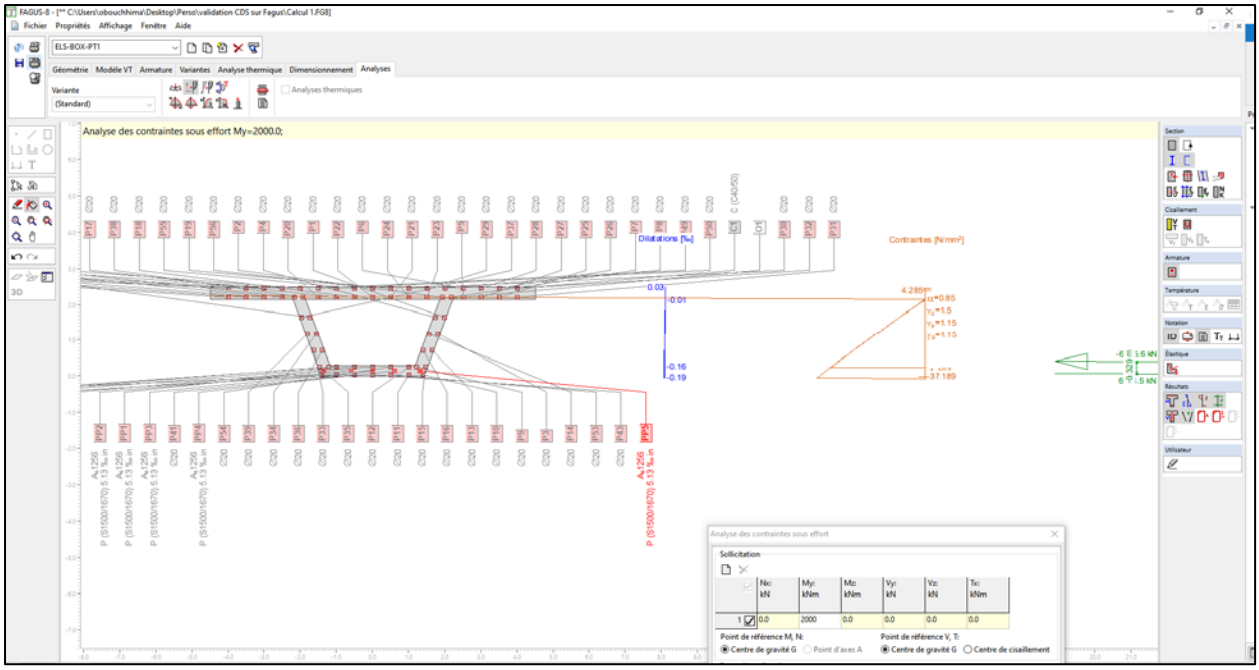
Efforts internes comme un couple de forces :

Efforts intérieurs de traction et compression	Sct princip. [kN]	Armature [kN]	Somme [kN]	Moments M	Unité [kNm]	Valeurs géométriques z	Unité [m]	x, d	Unité [m]
Compr. F_c=	-5840.9	-244.7	-6085.6	M_c=	-7354.6	z_c=	1.209	x_c =	2.222
Tract. F_s=	0.	6084.5	6084.5	M_s =	9355.8	z_s =	-1.538	d =	3.239
N =			-1.2	M =	2001.2	z =	-0.329	x/d =	0.69

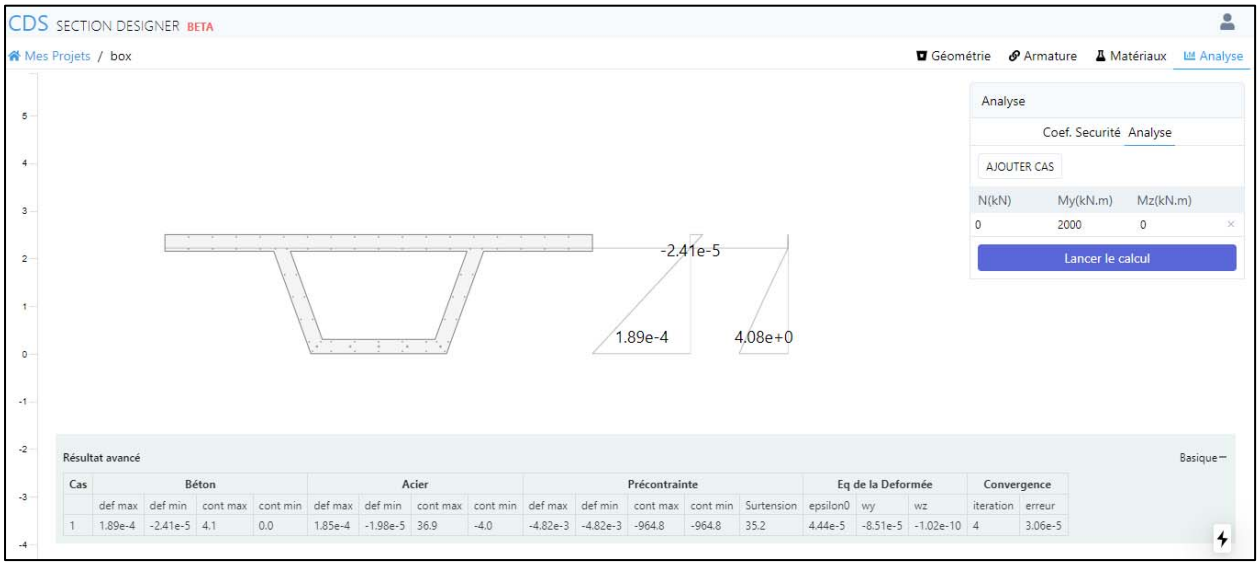
Calcul des fissures

Points de résultat

Formule / Résultat	Nom	Max	Min	Unité
σ(PP1(1.354,3.247))	σ_{PT}	1017.258	1017.258	N/mm²
Δσ((0.,1.696))	$\Delta\sigma_{PT}$	0.	0.	N/mm²



CDS-SectionDesigner



Results comparison

	CDS-SectionDesigner	Fagus	Error (%)
Deformation at COG (e^{-3})	-0.04	-0.04	0.0
Curvature about Y (e^{-3})	-0.1	-0.1	0.0
Curvature about Z (e^{-3})	0.0	0.0	0.0
Stress - Concrete (MPa)	-4.1	-4.1	0.0
Stress – Steel Min (MPa)	-36.9	-37.2	-0.8
Stress – Steel Max (MPa)	4.0	4.3	-7.0 (0.3 MPa)
Stress – PT Min (MPa)	964.8	965.4	-0.1
Stress – PT Max (MPa)	964.8	965.6	-0.1

ANALYSIS 2 – Prestressed Concrete

CUBUS-FAGUS

Analyse des contraintes sous effort

Sollicitations

No	AP	P	Flexion et effort normal N [kN]	M_y [kNm]	M_z [kNm]	Effort tranchant et torsion V_y [kN]	V_z [kN]	T [kNm]	Remarques -
1	!ELU		0	5000.0	5000.0				

Paramètres d'analyse "!ELU" Norme: Eurocode EN

Contraintes et dilatations extrêmes

Nom	Classe	y_q [m]	z_q [m]	ε [‰]	σ_d [N/mm²]	γ [-]
C1	C40/50	1.427	0.	-0.15	-3.259	1.76
C1	C40/50	-4.5	2.5	0.04	0.	1.76
P10	B500B	1.392	0.05	-0.15	-29.276	1.15
P52	B500B	-4.	2.45	0.04	7.233	1.15
PP5	S1500/1670	1.3	0.15	4.99	972.616	1.15
PP1	S1500/1670	-1.36	0.15	5.02	978.302	1.15

Contraintes calculées dans la section homogène (matériau linéaire)

Nom	Pondération	y_q [m]	z_q [m]	σ_{elas} [N/mm²]
C1	1.	1.427	0.	-3.415
C1	1.	-4.5	2.5	0.617

État au dernier pas d'itération

Efforts intérieurs N [kN]	M_y [kNm]	M_z [kNm]	Élongation et courbures ε_κ [‰]	χ_y [km⁻¹]	χ_z [km⁻¹]	Rigidités N/ε_κ [kN]	M_y/χ_y [kNm²]	M_z/χ_z [kNm²]
-1.3	4999.2	4999.8	-0.05	-0.1	0.0	26922.79	97203901.9	456093630.

Forces de précontrainte P(t=o) au début du chargement

N_p [kN]	M_{yp} [kNm]	M_{zp} [kNm]
-6279.7	-9706.5	-75.4

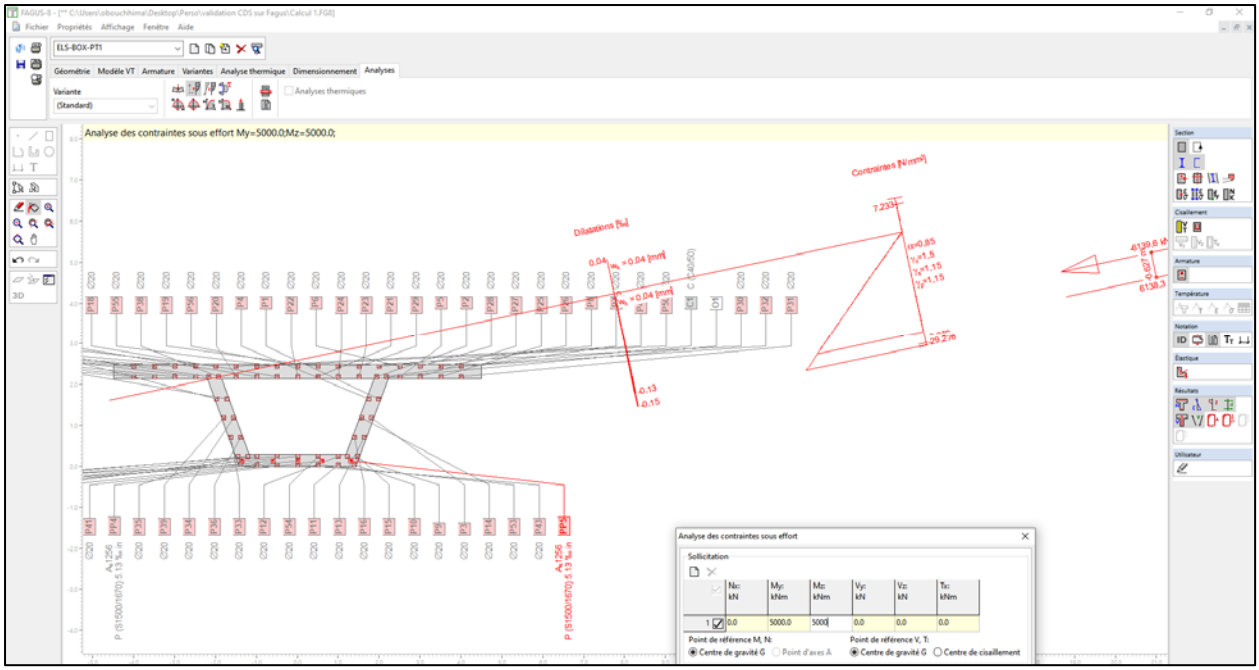
Efforts internes comme un couple de forces :

Efforts intérieurs de traction et compression	Sct princip. [kN]	Armature [kN]	Somme [kN]	Moments M	Unité [kNm]	Valeurs géométriques z	Unité [m]	x, d	Unité [m]
Compr. F_c=	-5913.5	-226.1	-6139.6	M_c=	-5378.5	z_c=	0.876	x_c =	2.84
Tract. F_s=	0.	6138.3	6138.3	M_s =	9225.9	z_s =	-1.503	d =	3.459
N =			-1.3	M =	3847.4	z =	-0.627	x/d =	0.82

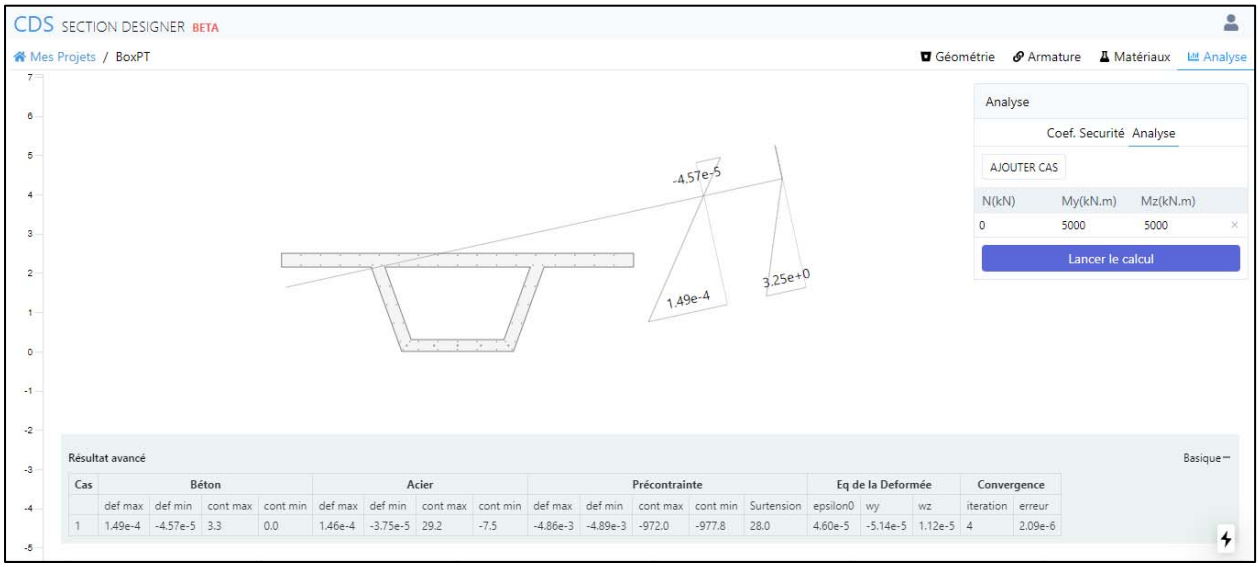
Calcul des fissures

Points de résultat

Formule / Résultat	Nom	Max	Min	Unité
σ(PP5(-0.949,3.478))	σ_{PT}	1010.804	1010.804	N/mm²
Δσ((0.,1.696))	$\Delta\sigma_{PT}$	0.	0.	N/mm²



CDS-SectionDesigner



Results comparison

	CDS-SectionDesigner	Fagus	Error (%)
Deformation at COG (e^{-3})	-0.05	-0.05	0.0
Curvature about Y (e^{-3})	-0.1	-0.1	0.0
Curvature about Z (e^{-3})	0.0	0.0	0.0
Stress - Concrete (MPa)	-3.3	-3.2	3.1 (0.1 MPa)
Stress – Steel Min (MPa)	-29.2	-29.3	-0.3
Stress – Steel Max (MPa)	7.5	7.2	4.2 (0.3 MPa)
Stress – PT Min (MPa)	972.0	972.6	-0.1
Stress – PT Max (MPa)	977.8	978.3	-0.1

ANALYSIS 3 – Prestressed Concrete

CUBUS-FAGUS

Analyse des contraintes sous effort

Sollicitations

No	AP	P	Flexion et effort normal N [kN]	M_y [kNm]	M_z [kNm]	Effort tranchant et torsion V_y [kN]	V_z [kN]	T [kNm]	Remarques -
1	!ELU		-20000.0	30000.0	-50000.0				

Paramètres d'analyse "!ELU" Norme: Eurocode EN

Contraintes et dilatations extrêmes

Nom	Classe	y_q [m]	z_q [m]	ε [‰]	σ_d [N/mm²]	γ [-]
C1	C40/50	-4.5	2.5	-1.08	-17.912	1.76
C1	C40/50	1.427	0.	1.12	0.	1.76
P52	B500B	-4.	2.45	-0.99	-198.453	1.15
P10	B500B	1.392	0.05	1.08	216.567	1.15
PP1	S1500/1670	-1.36	0.15	5.81	1132.574	1.15
PP5	S1500/1670	1.3	0.15	6.14	1197.491	1.15

Contraintes calculées dans la section homogène (matériau linéaire)

Nom	Pondération	y_q [m]	z_q [m]	σ_{elas} [N/mm²]
C1	1.	-4.5	2.5	-17.709
C1	1.	1.427	0.	6.325

État au dernier pas d'itération

Efforts intérieurs N [kN]	M_y [kNm]	M_z [kNm]	Élongation et courbures ε_κ [‰]	χ_y [km⁻¹]	χ_z [km⁻¹]	Rigidités N/ε_κ [kN]	M_y/χ_y [kNm²]	M_z/χ_z [kNm²]
-19997.3	29998.6	-49994.3	-0.05	0.6	-0.1	387926912.	51415999.1	399466010.

Forces de précontrainte P(t=o) au début du chargement

N_p [kN]	M_{yp} [kNm]	M_{zp} [kNm]
-6279.7	-9706.5	-75.4

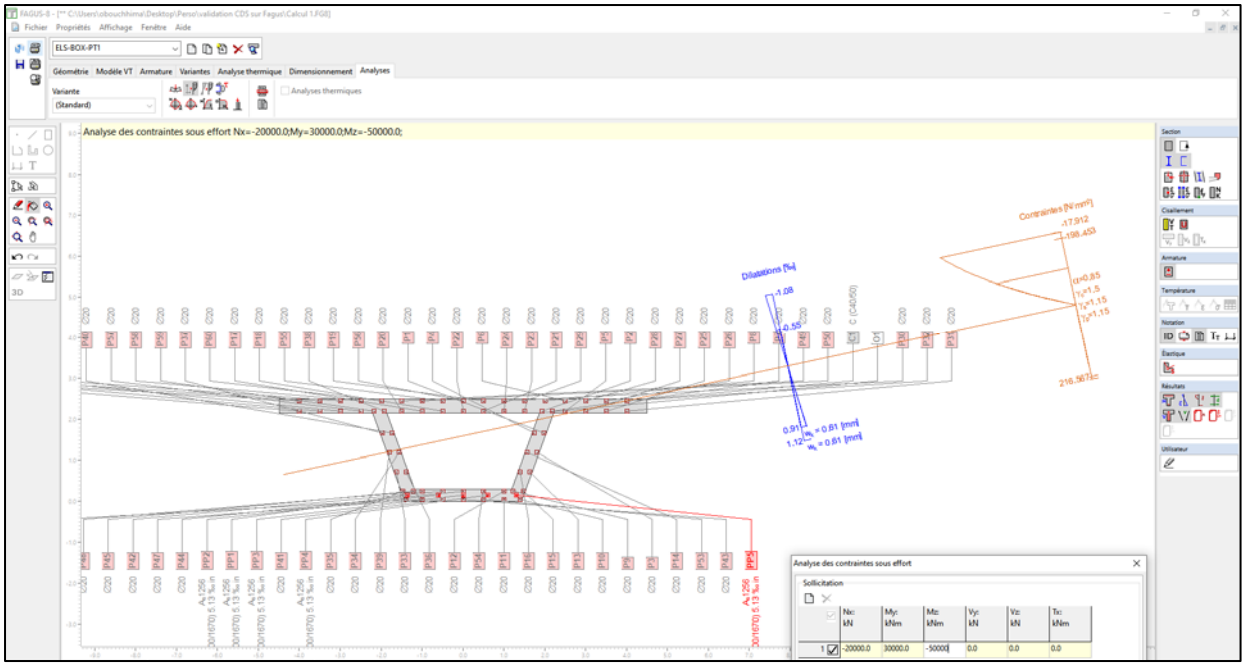
Efforts internes comme un couple de forces :

Efforts intérieurs de traction et compression	Sct princip. [kN]	Armature [kN]	Somme [kN]	Moments M	Unité [kNm]	Valeurs géométriques z	Unité [m]	x, d	Unité [m]
Compr. F_c=	-27409.7	-988.9	-28398.6	M_c=	-27238.8	z_c=	0.959	x_c =	1.817
Tract. F_s=	0.	8401.2	8401.2	M_s =	-12577.5	z_s =	1.497	d =	3.227
N =			-19997.3	M =	-39816.3	z =	2.456	x/d =	0.56

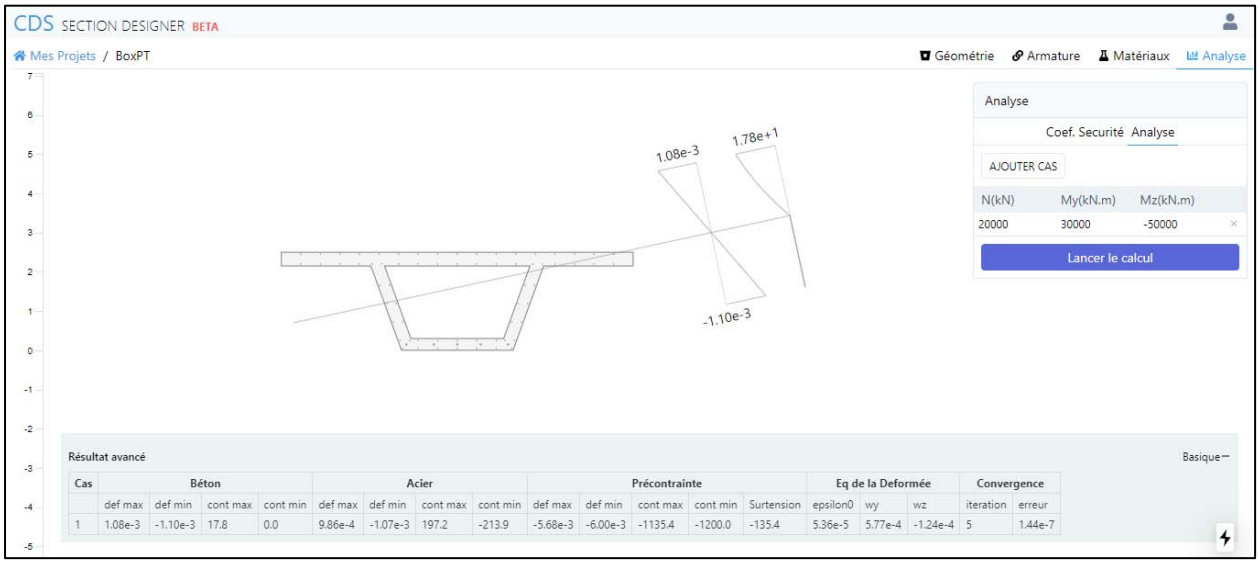
Calcul des fissures

Points de résultat

Formule / Résultat	Nom	Max	Min	Unité
σ(PP5(0.947,-0.088))	σ_{pT}	1215.982	1215.982	N/mm²
Δσ((0.,1.696))	$\Delta\sigma_{pT}$	0.	0.	N/mm²



CDS-SectionDesigner



Results comparison

	CDS-SectionDesigner	Fagus	Error (%)
Deformation at COG (e^{-3})	-0.05	-0.05	0.0
Curvature about Y (e^{-3})	0.6	0.6	0.0
Curvature about Z (e^{-3})	-0.1	-0.1	0.0
Stress - Concrete (MPa)	-17.8	-17.9	-0.6
Stress – Steel Min (MPa)	-197.2	-198.4	-0.6
Stress – Steel Max (MPa)	213.9	216.6	-1.2
Stress – PT Min (MPa)	1135.4	1132.6	0.2
Stress – PT Max (MPa)	1200.0	1197.5	0.2

ANALYSIS 4 – Prestressed Concrete

CUBUS-FAGUS

Analyse des contraintes sous effort

Sollicitations

No	AP	P	Flexion et effort normal N [kN]	M_y [kNm]	M_z [kNm]	Effort tranchant et torsion V_y [kN]	V_z [kN]	T [kNm]	Remarques -
1	!ELU		-20000.0	10000.0	-80000.0				

Paramètres d'analyse "!ELU" Norme: Eurocode EN

Contraintes et dilatations extrêmes

Nom	Classe	y_q [m]	z_q [m]	ε [‰]	σ_d [N/mm²]	γ [-]
C1	C40/50	-4.5	2.15	-1.89	-22.597	1.76
C1	C40/50	4.5	2.5	3.21	0.	1.76
P51	B500B	-4.	2.2	-1.6	-319.347	1.15
P32	B500B	4.	2.45	2.92	434.783	1.15
PP1	S1500/1670	-1.36	0.15	4.37	852.537	1.15
PP5	S1500/1670	1.3	0.15	5.85	1140.393	1.15

Contraintes calculées dans la section homogène (matériau linéaire)

Nom	Pondération	y_q [m]	z_q [m]	σ_{elas} [N/mm²]
C1	1.	-4.5	2.15	-18.974
C1	1.	4.5	2.5	9.03

État au dernier pas d'itération

Efforts intérieurs N [kN]	M_y [kNm]	M_z [kNm]	Élongation et courbures ε_x [‰]	χ_y [km⁻¹]	χ_z [km⁻¹]	Rigidités N/ε_x [kN]	M_y/χ_y [kNm²]	M_z/χ_z [kNm²]
-19996.1	10002.4	-79991.1	0.47	-0.3	-0.6	42590825.2	32841289.1	144139426.

Forces de précontrainte P(t=o) au début du chargement

N_p [kN]	M_{yp} [kNm]	M_{zp} [kNm]
-6279.7	-9706.5	-75.4

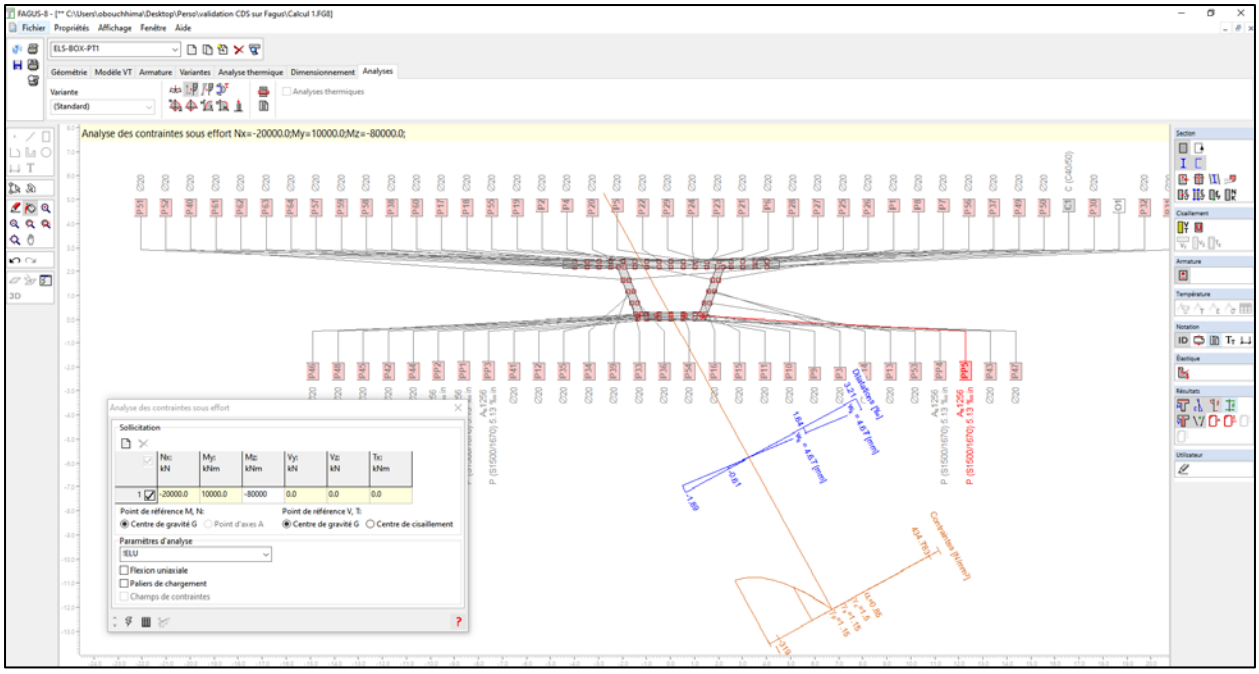
Efforts internes comme un couple de forces :

Efforts intérieurs de traction et compression	Sct princip. [kN]	Armature [kN]	Somme [kN]	Moments M	Unité [kNm]	Valeurs géométriques z	Unité [m]	x, d	Unité [m]
Compr. F_c=	-27835.2	-1167.5	-29002.7	M_c=	-64180.2	z_c=	2.213	x_c =	2.985
Tract. F_s=	0.	9006.6	9006.6	M_s =	-1134.5	z_s =	0.126	d =	3.852
N =			-19996.1	M =	-65314.8	z =	2.339	x/d =	0.77

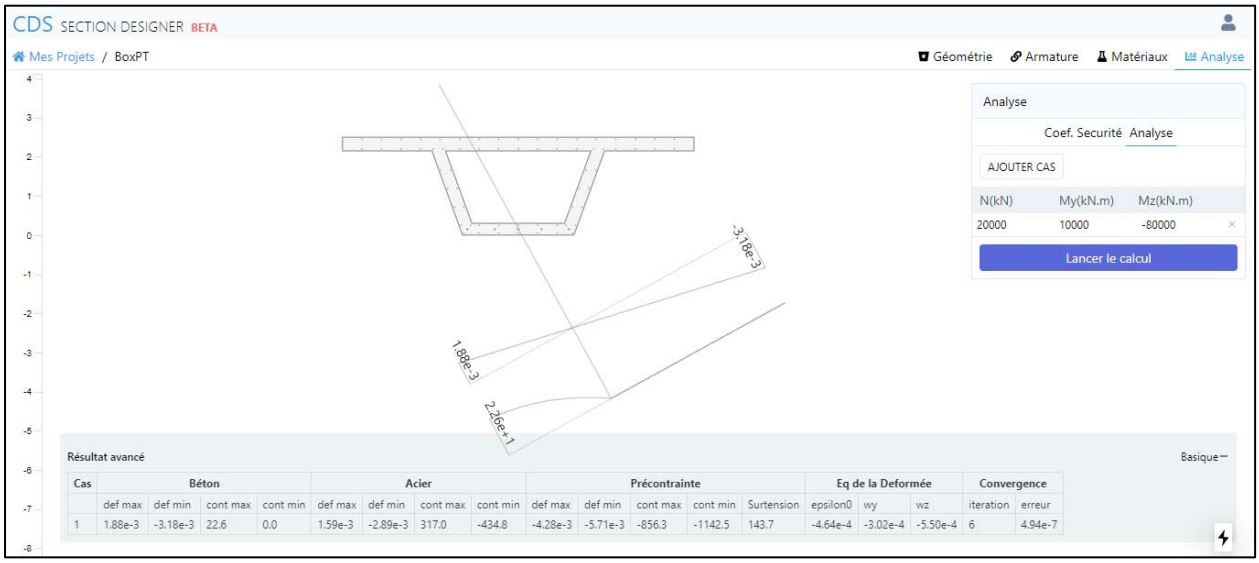
Calcul des fissures

Points de résultat

Formule / Résultat	Nom	Max	Min	Unité
σ(PP1(-0.701,3.632))	σ_{PT}	1130.645	1130.645	N/mm²
Δσ((0.,1.696))	$\Delta\sigma_{PT}$	0.	0.	N/mm²



CDS-SectionDesigner



Results comparison

	CDS-SectionDesigner	Fagus	Error (%)
Deformation at COG (e^{-3})	0.47	0.47	0.0
Curvature about Y (e^{-3})	-0.3	-0.3	0.0
Curvature about Z (e^{-3})	-0.6	-0.6	0.0
Stress - Concrete (MPa)	-22.6	-22.6	0.0
Stress – Steel Min (MPa)	-317.0	-319.3	-0.7
Stress – Steel Max (MPa)	434.8	434.8	0.0
Stress – PT Min (MPa)	856.3	852.6	0.4
Stress – PT Max (MPa)	1142.5	1140.4	0.2

ANALYSIS 5 – Prestressed Concrete

CUBUS-FAGUS

Analyse des contraintes sous effort

Sollicitations

No	AP	P	Flexion et effort normal N [kN]	M_y [kNm]	M_z [kNm]	Effort tranchant et torsion V_y [kN]	V_z [kN]	T [kNm]	Remarques -
1	!ELU		0	0	-30000.0				

Paramètres d'analyse "!ELU" Norme: Eurocode EN

Contraintes et dilatations extrêmes

Nom	Classe	y_q [m]	z_q [m]	ε [‰]	σ_d [N/mm²]	γ [-]
C1	C40/50	-1.427	0.	-1.36	-20.354	1.76
C1	C40/50	4.5	2.5	7.05	0.	1.76
P46	B500B	-1.392	0.05	-1.26	-252.992	1.15
P32	B500B	4.	2.45	6.56	434.783	1.15
PP1	S1500/1670	-1.36	0.15	4.02	784.417	1.15
PP5	S1500/1670	1.3	0.15	6.32	1232.155	1.15

Contraintes calculées dans la section homogène (matériau linéaire)

Nom	Pondération	y_q [m]	z_q [m]	σ_{elas} [N/mm²]
C1	1.	-1.427	0.	-6.899
C1	1.	4.5	2.5	6.009

État au dernier pas d'itération

Efforts intérieurs N [kN]	M_y [kNm]	M_z [kNm]	Élongation et courbures ε_κ [‰]	χ_y [km⁻¹]	χ_z [km⁻¹]	Rigidités N/ε_κ [kN]	M_y/χ_y [kNm²]	M_z/χ_z [kNm²]
0.7	0.8	-29998.8	2.11	-1.3	-0.9	337.21	643.31	34753279.5

Forces de précontrainte P(t=o) au début du chargement

N_p [kN]	M_{yp} [kNm]	M_{zp} [kNm]
-6279.7	-9706.5	-75.4

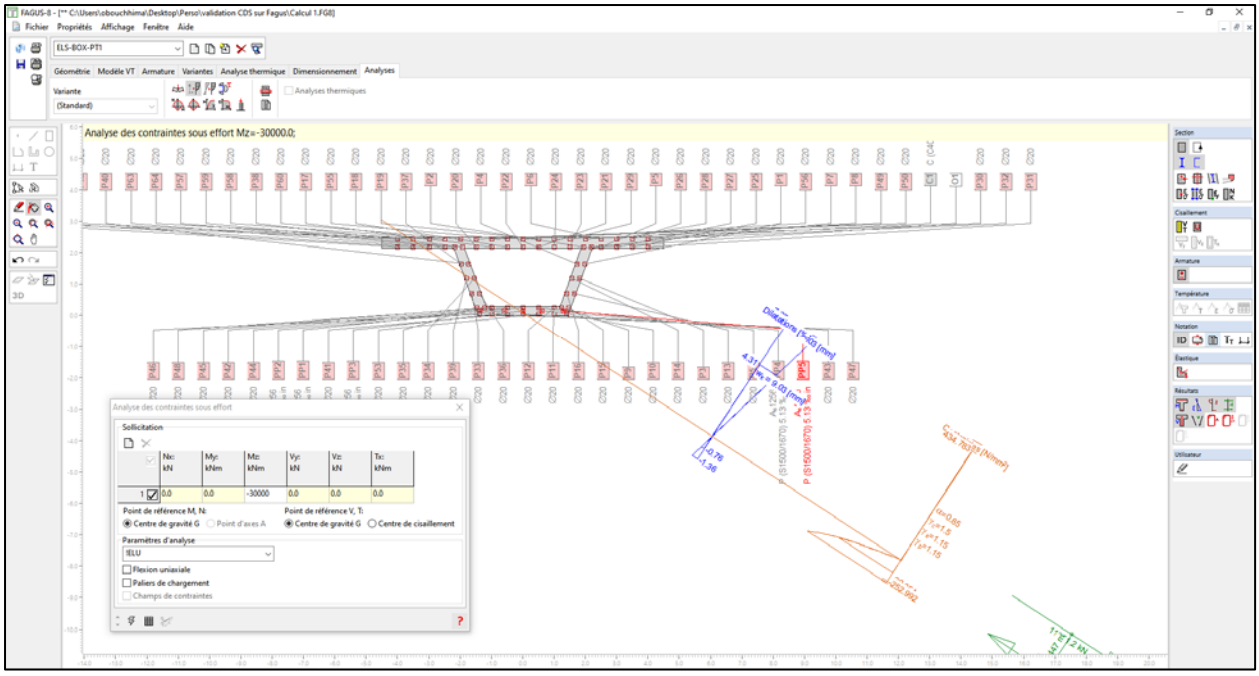
Efforts internes comme un couple de forces :

Efforts intérieurs de traction et compression	Sct princip. [kN]	Armature [kN]	Somme [kN]	Moments M	Unité [kNm]	Valeurs géométriques z	Unité [m]	x, d	Unité [m]
Compr. F_c=	-10852.5	-498.	-11350.5	M_c=	-20181.9	z_c=	1.778	x_c =	0.863
Tract. F_s=	0.	11351.2	11351.2	M_s =	3763.4	z_s =	-0.332	d =	2.532
N =			0.7	M =	-16418.4	z =	1.447	x/d =	0.34

Calcul des fissures

Points de résultat

Formule / Résultat	Nom	Max	Min	Unité
σ(PP4(-1.348,2.661))	σ_{PT}	1304.348	1304.348	N/mm²
Δσ((0.,1.696))	$\Delta\sigma_{PT}$	0.	0.	N/mm²



CDS-SectionDesigner

Cas	Béton				Acier				Précontrainte					Eq de la Deformée			Convergence	
	def max	def min	cont max	cont min	def max	def min	cont max	cont min	def max	def min	cont max	cont min	Surtension	epsilon0	wy	wz	iteration	erreur
1	1.35e-3	-6.95e-3	20.2	0.0	1.25e-3	-6.46e-3	250.2	-434.8	-3.96e-3	-6.17e-3	-791.5	-1233.8	208.5	-2.07e-3	-1.30e-3	-8.51e-4	7	2.48e-5

Results comparison

	CDS-SectionDesigner	Fagus	Error (%)
Deformation at COG (e^{-3})	2.11	2.11	0.0
Curvature about Y (e^{-3})	-1.3	-1.3	0.0
Curvature about Z (e^{-3})	-0.9	-0.9	0.0
Stress - Concrete (MPa)	-20.2	-20.3	-0.5
Stress – Steel Min (MPa)	-250.2	-253.0	-1.1
Stress – Steel Max (MPa)	434.8	434.8	0.0
Stress – PT Min (MPa)	791.5	784.4	0.9
Stress – PT Max (MPa)	1233.8	1232.2	0.1

ANALYSIS 6 – Prestressed Concrete

CUBUS-FAGUS

Analyse des contraintes sous effort

Sollicitations

No	AP	P	Flexion et effort normal N [kN]	M_y [kNm]	M_z [kNm]	Effort tranchant et torsion V_y [kN]	V_z [kN]	T [kNm]	Remarques -
1	!ELU		-20000.0	0	-30000.0				

Paramètres d'analyse "!ELU" Norme: Eurocode EN

Contraintes et dilatations extrêmes

Nom	Classe	y_q [m]	z_q [m]	ε [‰]	σ_d [N/mm²]	γ [-]
C1	C40/50	-1.427	0.	-0.5	-9.874	1.76
C1	C40/50	4.5	2.5	0.16	0.	1.76
P46	B500B	-1.392	0.05	-0.49	-97.918	1.15
P32	B500B	4.	2.45	0.13	25.014	1.15
PP1	S1500/1670	-1.36	0.15	4.65	907.097	1.15
PP5	S1500/1670	1.3	0.15	4.82	940.048	1.15

Contraintes calculées dans la section homogène (matériau linéaire)

Nom	Pondération	y_q [m]	z_q [m]	σ_{elas} [N/mm²]
C1	1.	-1.427	0.	-10.648
C1	1.	4.5	2.5	2.259

État au dernier pas d'itération

Efforts intérieurs N [kN]	M_y [kNm]	M_z [kNm]	Élongation et courbures ε_x [‰]	χ_y [km⁻¹]	χ_z [km⁻¹]	Rigidités N/ε_x [kN]	M_y/χ_y [kNm²]	M_z/χ_z [kNm²]
-19997.5	1.3	-29997.	-0.21	-0.1	-0.1	93200364.5	11125.14	472198075.

Forces de précontrainte P(t=o) au début du chargement

N_p [kN]	M_{yp} [kNm]	M_{zp} [kNm]
-6279.7	-9706.5	-75.4

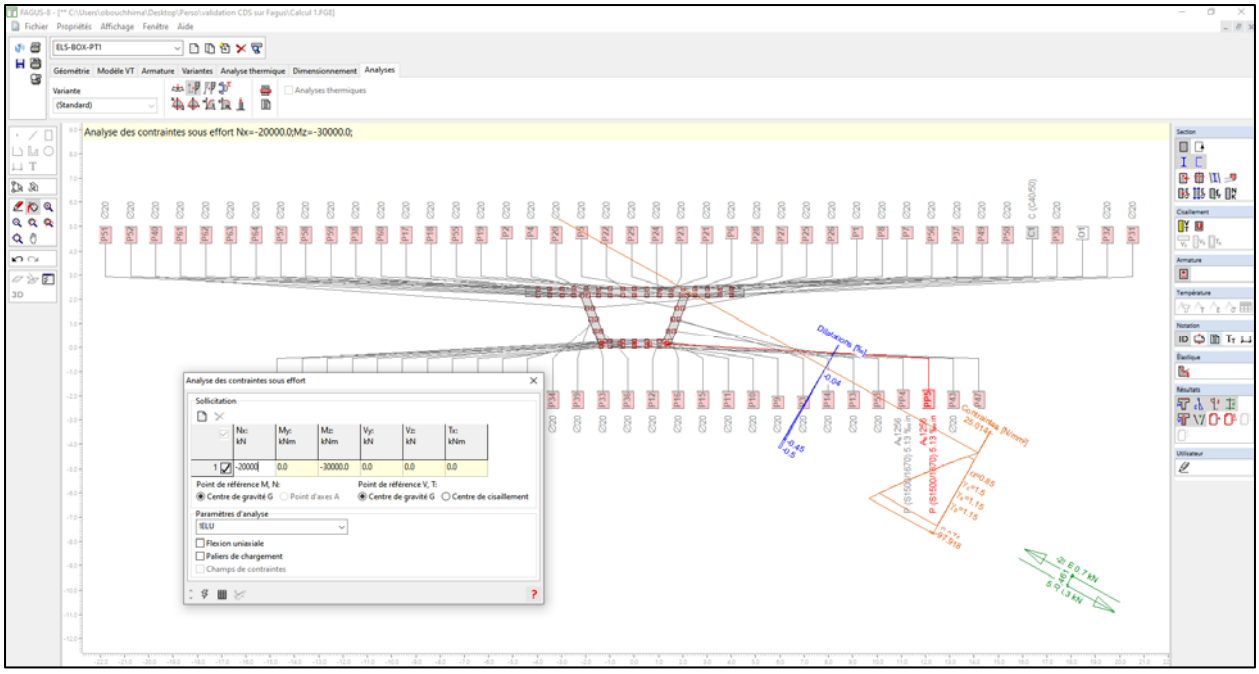
Efforts internes comme un couple de forces :

Efforts intérieurs de traction et compression	Sct princip. [kN]	Armature [kN]	Somme [kN]	Moments M	Unité [kNm]	Valeurs géométriques z	Unité [m]	x, d	Unité [m]
Compr. F_c=	-24877.8	-952.9	-25830.7	M_c=	-22412.1	z_c=	0.868	x_c =	3.828
Tract. F_s=	0.	5833.3	5833.3	M_s =	7751.1	z_s =	-1.329	d =	3.506
N =			-19997.5	M =	-14661.1	z =	-0.461		

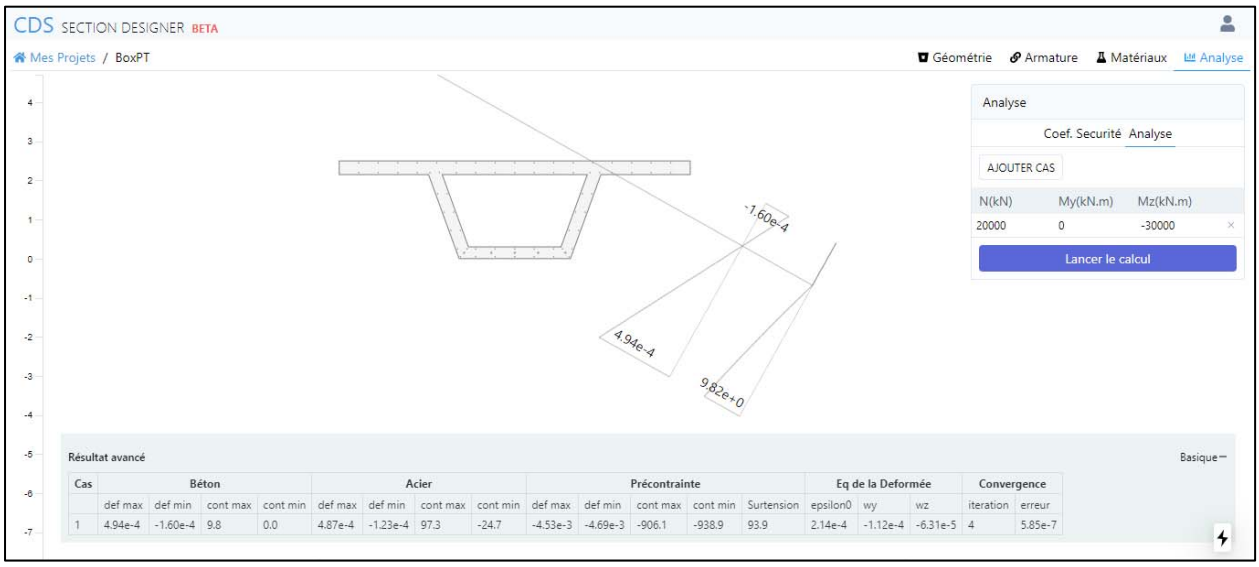
Calcul des fissures

Points de résultat

Formule / Résultat	Nom	Max	Min	Unité
σ(PP1(0.431,3.709))	σ_{PT}	1007.971	1007.971	N/mm²
Δσ((0.,1.696))	$\Delta\sigma_{PT}$	0.	0.	N/mm²



CDS-SectionDesigner



Results comparison

	CDS-SectionDesigner	Fagus	Error (%)
Deformation at COG (e^{-3})	-0.21	-0.21	0.0
Curvature about Y (e^{-3})	-0.1	-0.1	0.0
Curvature about Z (e^{-3})	-0.1	-0.1	0.0
Stress - Concrete (MPa)	-9.8	-9.9	-1.0
Stress – Steel Min (MPa)	-97.3	-98.0	-0.7
Stress – Steel Max (MPa)	24.7	25.0	-1.2
Stress – PT Min (MPa)	906.1	907.0	-0.1
Stress – PT Max (MPa)	938.9	940.0	-0.1

ANALYSIS 7 – Prestressed Concrete

CUBUS-FAGUS

Analyse des contraintes sous effort

Sollicitations

No	AP	P	Flexion et effort normal N [kN]	M_y [kNm]	M_z [kNm]	Effort tranchant et torsion V_y [kN]	V_z [kN]	T [kNm]	Remarques -
1	!ELU		-20000.0	0	30000.0				

Paramètres d'analyse "!ELU" Norme: Eurocode EN

Contraintes et dilatations extrêmes

Nom	Classe	y_q [m]	z_q [m]	ε [‰]	σ_d [N/mm²]	γ [-]
C1	C40/50	1.427	0.	-0.5	-9.861	1.76
C1	C40/50	-4.5	2.5	0.16	0.	1.76
P10	B500B	1.392	0.05	-0.49	-97.777	1.15
P52	B500B	-4.	2.45	0.12	24.56	1.15
PP5	S1500/1670	1.3	0.15	4.66	907.966	1.15
PP1	S1500/1670	-1.36	0.15	4.82	940.673	1.15

Contraintes calculées dans la section homogène (matériau linéaire)

Nom	Pondération	y_q [m]	z_q [m]	σ_{elas} [N/mm²]
C1	1.	1.427	0.	-10.639
C1	1.	-4.5	2.5	2.233

État au dernier pas d'itération

Efforts intérieurs N [kN]	M_y [kNm]	M_z [kNm]	Élongation et courbures ε_x [‰]	χ_y [km-1]	χ_z [km-1]	Rigidités N/ε_x [kN]	M_y/χ_y [kNm²]	M_z/χ_z [kNm²]
-19997.5	1.3	29997.1	-0.21	-0.1	0.1	93090201.4	11155.85	475717171.

Forces de précontrainte P(t=o) au début du chargement

N_p [kN]	M_{yp} [kNm]	M_{zp} [kNm]
-6279.7	-9706.5	-75.4

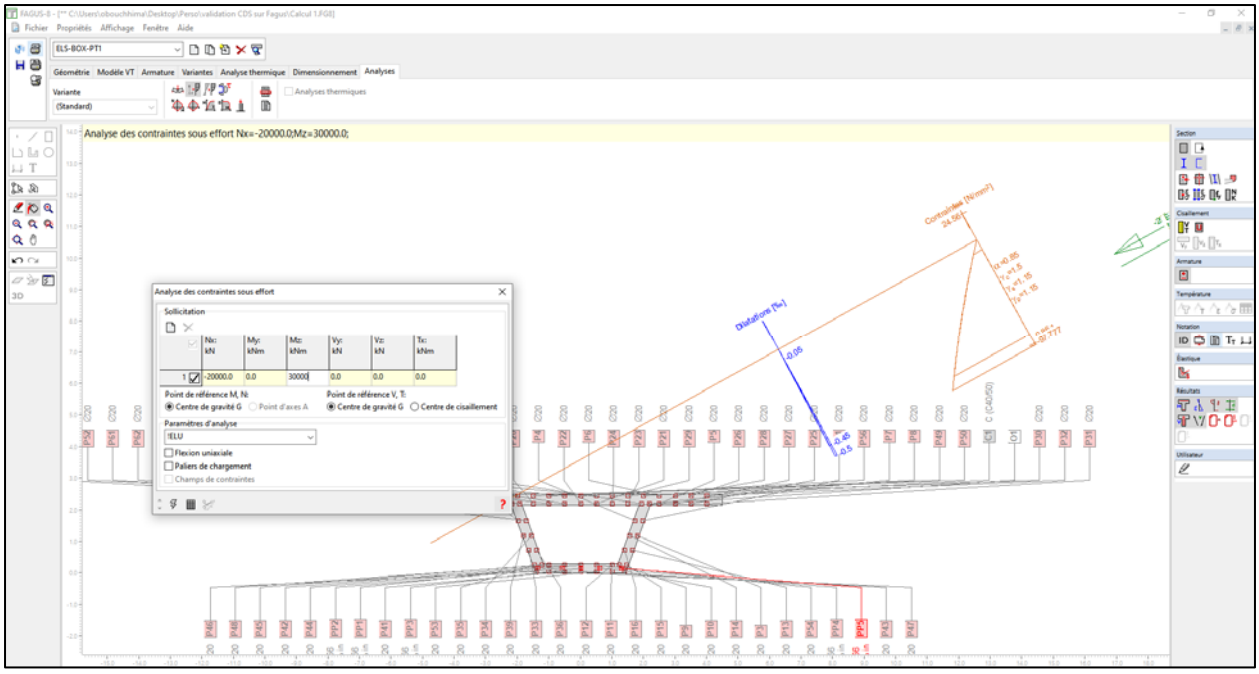
Efforts internes comme un couple de forces :

Efforts intérieurs de traction et compression	Sct princip. [kN]	Armature [kN]	Somme [kN]	Moments M	Unité [kNm]	Valeurs géométriques z	Unité [m]	x, d	Unité [m]
Compr. F_c=	-24878.8	-952.9	-25831.7	M_c=	-22295.6	z_c=	0.863	x_c =	3.834
Tract. F_s=	0.	5834.2	5834.2	M_s =	7699.2	z_s =	-1.32	d =	3.495
N =			-19997.5	M =	-14596.5	z =	-0.457		

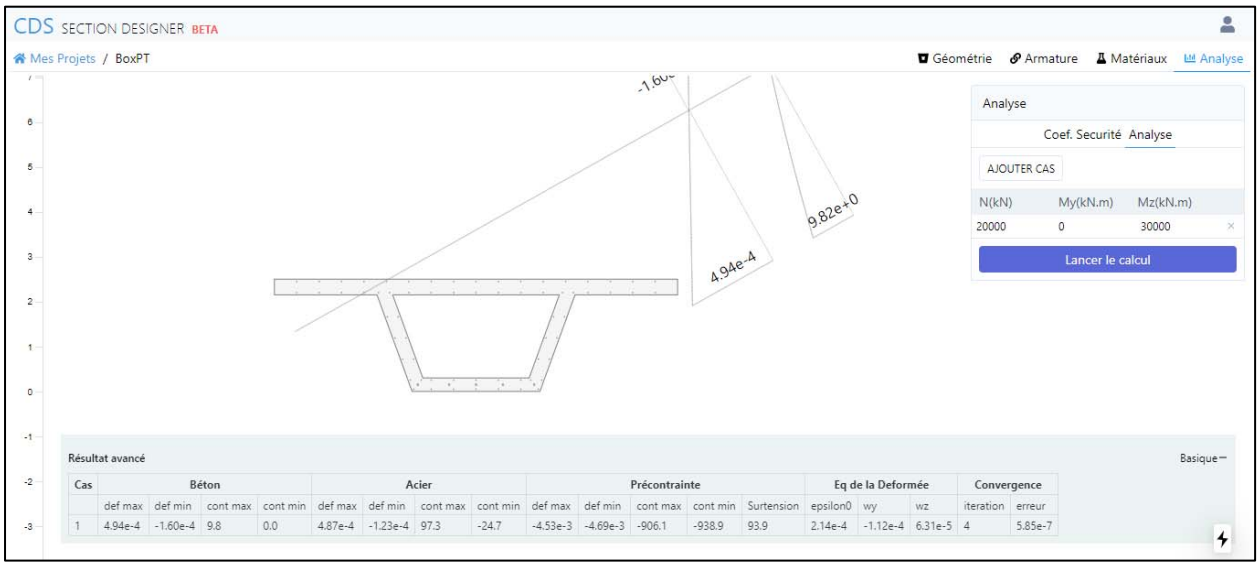
Calcul des fissures

Points de résultat

Formule / Résultat	Nom	Max	Min	Unité
σ(PP5(-0.384,3.679))	σ_{PT}	1006.558	1006.558	N/mm²
Δσ((0.,1.696))	$\Delta\sigma_{PT}$	0.	0.	N/mm²



CDS-SectionDesigner



Results comparison

	CDS-SectionDesigner	Fagus	Error (%)
Deformation at COG (e^{-3})	-0.21	-0.21	0.0
Curvature about Y (e^{-3})	-0.1	-0.1	0.0
Curvature about Z (e^{-3})	0.1	0.1	0.0
Stress - Concrete (MPa)	-9.8	-9.9	-1.0
Stress – Steel Min (MPa)	-97.3	-98.0	-0.7
Stress – Steel Max (MPa)	24.7	25.0	-1.2
Stress – PT Min (MPa)	906.1	907.0	-0.1
Stress – PT Max (MPa)	938.9	940.0	-0.1

ANALYSIS 8 – Prestressed Concrete

CUBUS-FAGUS

Analyse des contraintes sous effort

Sollicitations

No	AP	P	Flexion et effort normal N [kN]	M_y [kNm]	M_z [kNm]	Effort tranchant et torsion V_y [kN]	V_z [kN]	T [kNm]	Remarques -
1	!ELU		-20000.0	-20000.0	30000.0				

Paramètres d'analyse "!ELU" Norme: Eurocode EN

Contraintes et dilatations extrêmes

Nom	Classe	y_q [m]	z_q [m]	ε [‰]	σ_d [N/mm²]	γ [-]
C1	C40/50	1.427	0.	-1.37	-20.45	1.76
C1	C40/50	-4.5	2.5	1.85	0.	1.76
P10	B500B	1.392	0.05	-1.33	-266.128	1.15
P52	B500B	-4.	2.45	1.69	338.773	1.15
PP5	S1500/1670	1.3	0.15	3.89	758.652	1.15
PP1	S1500/1670	-1.36	0.15	4.55	887.13	1.15

Contraintes calculées dans la section homogène (matériau linéaire)

Nom	Pondération	y_q [m]	z_q [m]	σ_{elas} [N/mm²]
C1	1.	1.427	0.	-18.989
C1	1.	-4.5	2.5	6.193

État au dernier pas d'itération

Efforts intérieurs N [kN]	M_y [kNm]	M_z [kNm]	Élongation et courbures ε_κ [‰]	χ_y [km⁻¹]	χ_z [km⁻¹]	Rigidités N/ε_κ [kN]	M_y/χ_y [kNm²]	M_z/χ_z [kNm²]
-19995.9	-19994.	29997.2	0.17	-0.7	0.2	116080766.	28411772.1	121106088.

Forces de précontrainte P(t=o) au début du chargement

N_p [kN]	M_{yp} [kNm]	M_{zp} [kNm]
-6279.7	-9706.5	-75.4

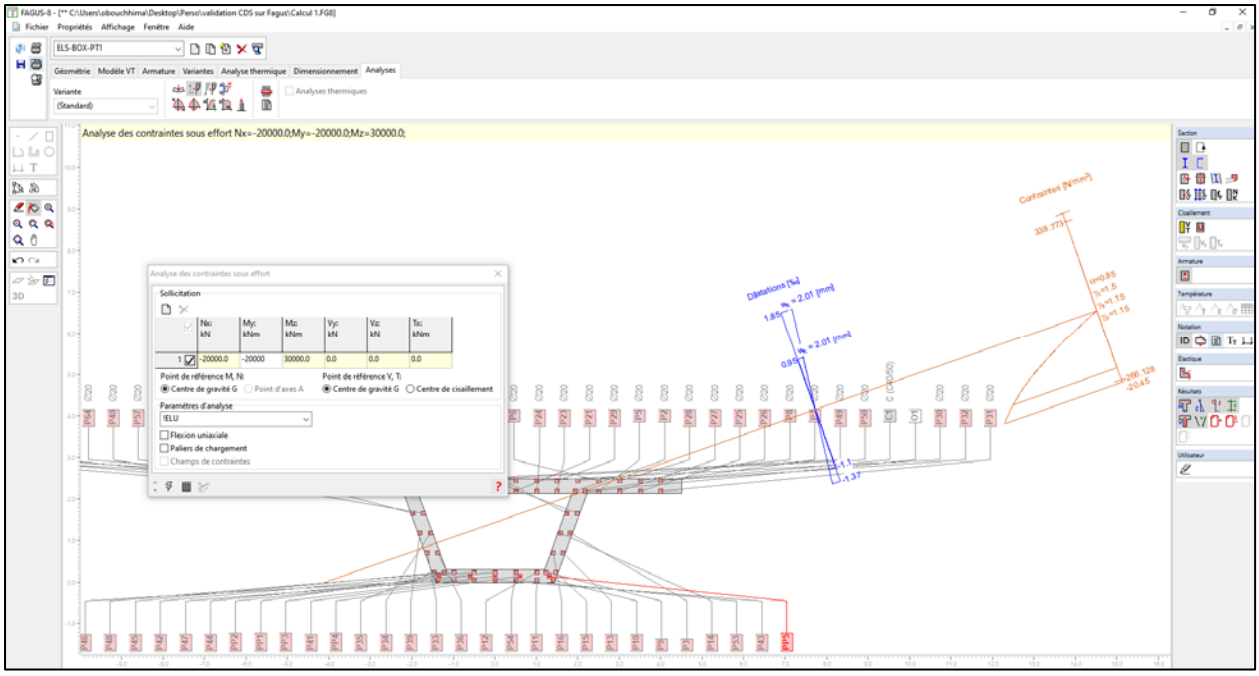
Efforts internes comme un couple de forces :

Efforts intérieurs de traction et compression	Sct princip. [kN]	Armature [kN]	Somme [kN]	Moments M	Unité [kNm]	Valeurs géométriques z	Unité [m]	x, d	Unité [m]
Compr. F_c=	-25488.7	-1256.9	-26745.5	M_c=	-34324.5	z_c=	1.283	x_c =	1.842
Tract. F_s=	0.	6749.6	6749.6	M_s =	5505.1	z_s =	-0.816	d =	2.889
N =			-19995.9	M =	-28819.4	z =	0.468	x/d =	0.64

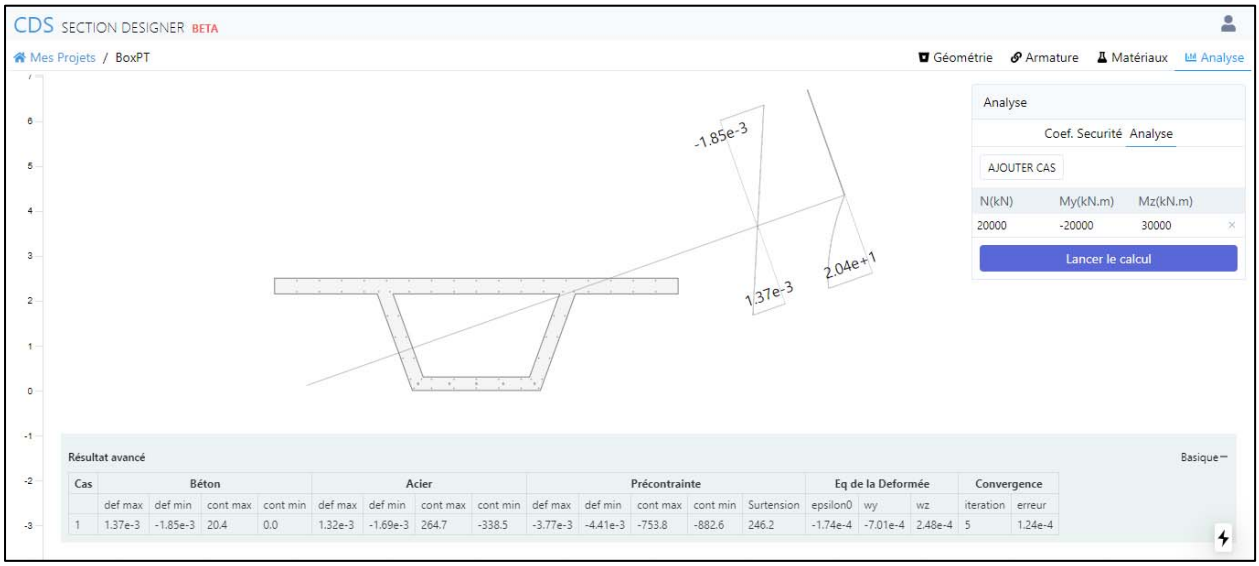
Calcul des fissures

Points de résultat

Formule / Résultat	Nom	Max	Min	Unité
σ(PP5(-0.713,3.585))	σ_{pT}	1304.348	1304.348	N/mm²
Δσ((0.,1.696))	$\Delta\sigma_{pT}$	0.	0.	N/mm²



CDS-SectionDesigner



Results comparison

	CDS-SectionDesigner	Fagus	Error (%)
Deformation at COG (e^{-3})	0.17	0.17	0.0
Curvature about Y (e^{-3})	-0.7	-0.7	0.0
Curvature about Z (e^{-3})	0.2	0.2	0.0
Stress - Concrete (MPa)	-20.4	-20.5	-0.2
Stress – Steel Min (MPa)	-264.7	-266.1	-0.5
Stress – Steel Max (MPa)	338.5	338.8	-0.1
Stress – PT Min (MPa)	753.8	758.6	-0.6
Stress – PT Max (MPa)	882.6	887.1	-0.5