구 조 설 계 검 토 서

시스템비계

양천자원회수시설 비계설치

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1. 개요

1.1. 설계개요

1.1.1. 설계개요

(1) 일반사항

1) 공 사 명 : 양천자원회수시설 비계설치

2) 대 지 위 치 : 서울특별시 양천구

3) 비 계 용 도 : 시스템비계 설치 후 내벽면 판넬 설치

4) 층 수 및 높 이 : 비계 설치 높이 17.3 m

1.1.2. 적용기준서

1) KDS 21 10 00 : 가시설물 설계 일반사항

2) KDS 21 60 00 : 비계 및 안전시설물 설계기준

3) KDS 21 50 00 : 거푸집 및 동바리 설계기준

4) KCS 21 60 05 : 비계공사 일반사항

5) KCS 21 60 10 : 비계

6) KDS 14 30 05 : 강구조 설계 일반사항(허용 응력 설계법)

7) KDS 14 30 10 : 강구조 부재 설계기준(허용 응력 설계법)

1.1.3. 설계조건

(1) 사용재료의 종류 및 설계기준강도

사 용 재 료	설계기준강도	규 격	부 재 규 격
수직재	355 N/㎟	SGT355	Ø48.6×2.3t
장선재	275 N/㎟	SGT275	Ø42.7×2.3t
띠장재	275 N/㎟	SGT275	Ø42.7×2.3t
난간재	275 N/㎟	SGT275	Ø42.7×2.3t
경사재	275 N/㎟	SGT275	Ø42.7×2.3t
기둥 받침	스크류 잭베이스, Ø34×2.3t, 받침철판 140×140		
수평 받침 (벽이음)	-		

(2) 해석 및 설계용 프로그램

1) 부 재 해 석 : 골조 해석 MIDAS GEN

2) 부 재 설 계 : 각 부재별 설계프로그램 MIDAS GEN

(3) 지반조건

1) 수 직 재 지 지 : Pin Support

2) 특 기 사 항

① 비계 전도 방지를 위한 벽이음 철물은 수평 3.048m × 5m 이내로 기둥재에 연결하여 설치 할 것

1.2. 하중조건

(1) 고정하중

1) 비계의 각종 연결철물 등을 고려하여 자중에 10% 하중을 할증

2) 작업발판의 중량은 실제 중량을 반영하여야 하며, 0.2 kN/㎡ 이상이어야 한다.

(2) 작업하중

1) 통로의 역할을 하는 비계와 가벼운 공구만을 필요로 하는 경작업에 대해서는 바닥면적에 대해 1.25 kN/㎡ 이상이어야 한다.

(3) 수평하중

1) 연직하중의 5%에 해당하는 수평하중을 수직재 위치에 적용한다.

(4) 풍하중

1) 실내작업으로 풍하중의 영향을 고려하지 않음

1.3. 하중조합

- 허용응력도설계법(KSSC-ASD03)_강구조

midas Gen LOAD COMBINATION

Certified by :

PROJECT TITLE : 양천자원회수시설

MIDAS	Company		Client	
	Author		File Name	양천자원회수시설.lcp

```
+============================================================+
|  MIDAS(Modeling, Integrated Design & Analysis Software)    |
|  midas Gen - Load Combinations                             |
|                                                (c)SINCE 1989  |
+============================================================+
|  MIDAS Information Technology Co.,Ltd.          (MIDAS IT)  |
|  Gen 2025                                                  |
+============================================================+
```

DESIGN TYPE : Steel Design

LIST OF LOAD COMBINATIONS

NUM	NAME	ACTIVE / TYPE	LOADCASE(FACTOR) +	LOADCASE(FACTOR) +	LOADCASE(FACTOR)
1	LCB1	Strength/Stress	Add		
		DD(1.000) +	LL(1.000)		
2	LCB2	Strength/Stress	Add		
		DD(1.000) +	LL(1.000) +	Mx(+)(1.000)	
3	LCB3	Strength/Stress	Add		
		DD(1.000) +	LL(1.000) +	Mx(-)(1.000)	
4	LCB4	Strength/Stress	Add		
		DD(1.000) +	LL(1.000) +	My(+)(1.000)	
5	LCB5	Strength/Stress	Add		
		DD(1.000) +	LL(1.000) +	My(-)(1.000)	

KDS 21 10 00 : 2022 가시설물 설계 일반사항

3. 설계하중 및 하중조합

3.3.1 거푸집 및 동바리, 비계 및 안전시설물

표 3.3-1 거푸집 및 동바리 등의 하중조합 및 허용응력증가계수

CASE	하중조합	허용응력증가계수
1	D + L + M	1.00
2	D + W	1.25
3	D + L + M + S	1.50

Modeling, Integrated Design & Analysis Software
http://www.MidasUser.com
Gen 2025

Print Date/Time : 09/04/2026 17:41

- 1 / 1 -

2. 설계 하중

2.1. 고정하중

(1) 고정하중

1) 비계의 각종 연결철물 등을 고려하여 자중에 10% 하중을 할증한다. : Selfweight × 1.1

2) 작업발판의 중량 0.2 kN/㎡ 이상이어야 한다. : 0.2 kN/㎡

2.2. 작업하중

(1) 작업하중

1) 최상단 작업발판 : 1.25 kN/㎡

2.3. 수평하중

(1) 수평하중

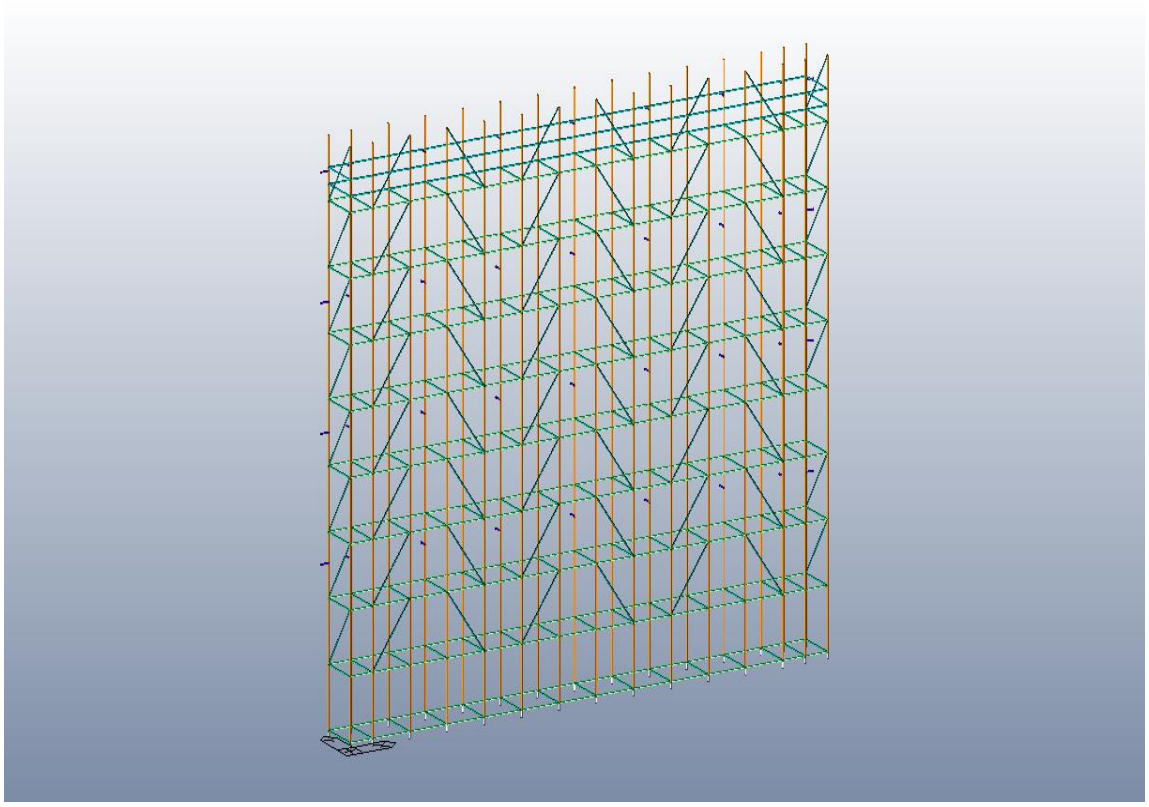
※ 기둥 1본 당 고정하중

1)	기둥재	:	1,900	㎜ ×	0.0263	N/㎜	=	49.97	N
2)	장선재	:	1,524	㎜ ×	0.0229	N/㎜ / 2	=	17.45	N
3)	띠장재	:	1,524	㎜ ×	0.0229	N/㎜	=	34.90	N
4)	난간재	:	1,524	㎜ ×	0.0229	N/㎜ × 2	=	69.80	N
5)	경사재	:	2,435.7	㎜ ×	0.0229	N/㎜ / 2	=	27.89	N
6)	클램프, 벽이음 등	:					=	20.00	N
7)	합 계	:					=	220.01	N
8)	작업발판	:	0.0002	N/㎟ × ((1,524㎜ / 2) × 1,524㎜)			=	232.26	N
	고정하중 (D)	:	220.01	N × 10 단 + 232.26			=	2,432.33	N
	작업하중 (L)	:	0.00125	N/㎟ × ((1,524㎜ / 2) × 1,524㎜)			=	1,451.61	N
	수평하중 (M)	: (고정하중 + 작업하중) × 5%					=	194.20	N

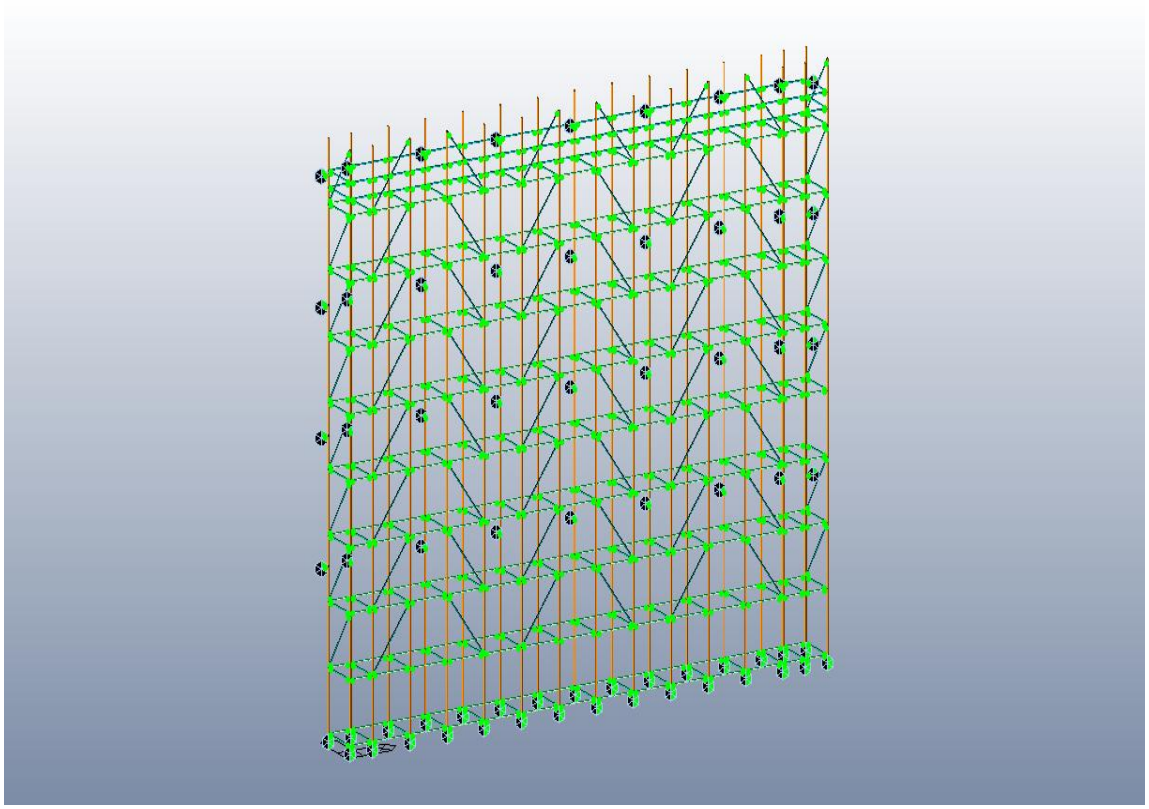
2.4. 풍하중

(1) 풍하중 해당없음

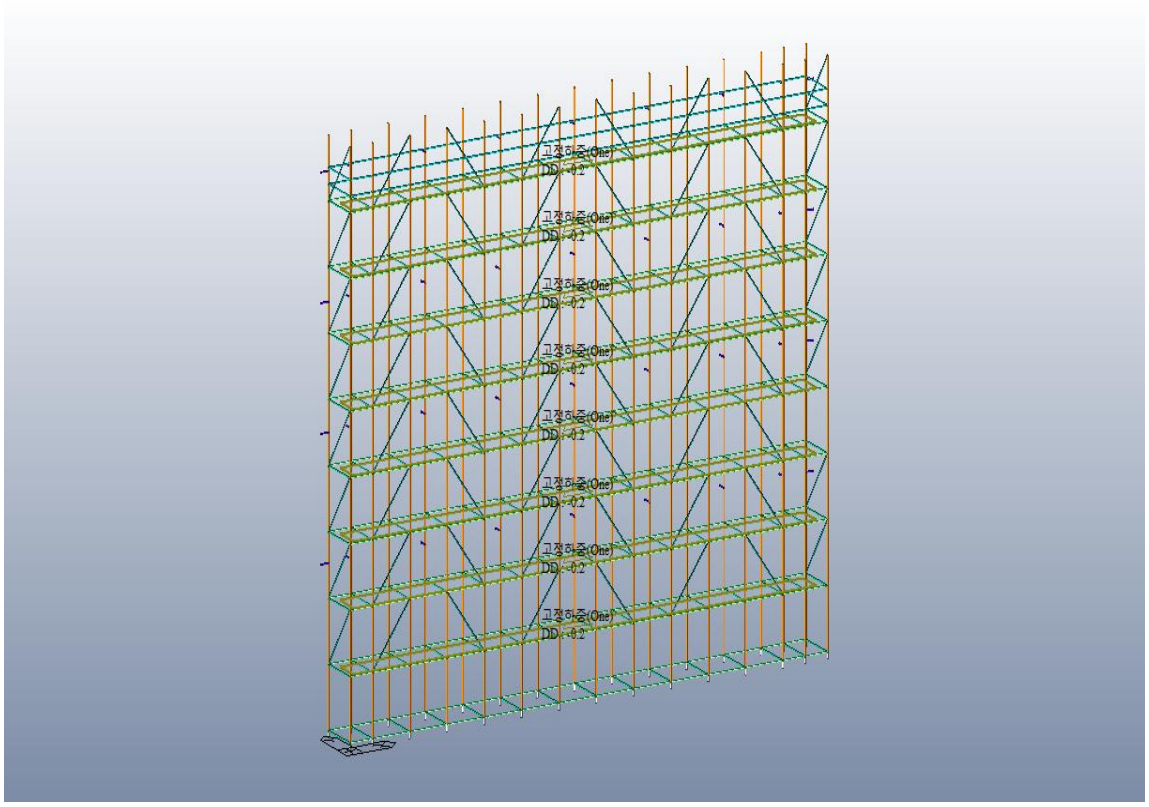
- MODELING



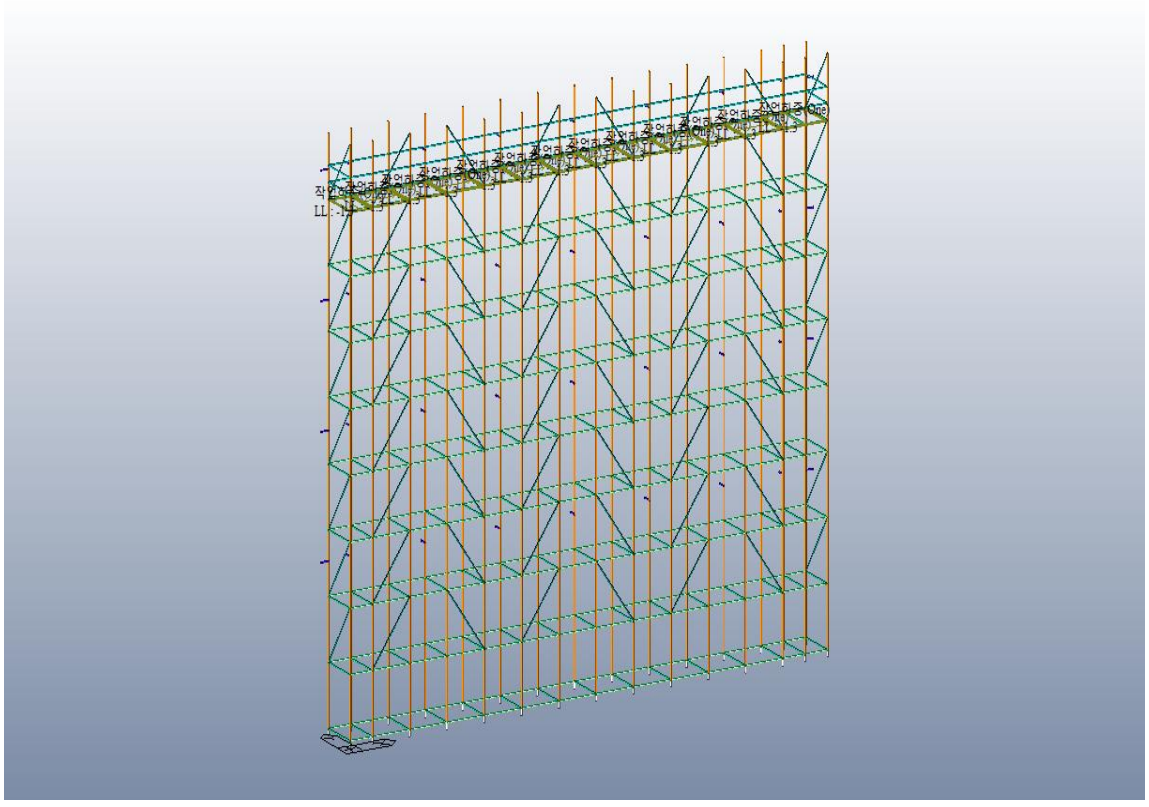
- 경계조건



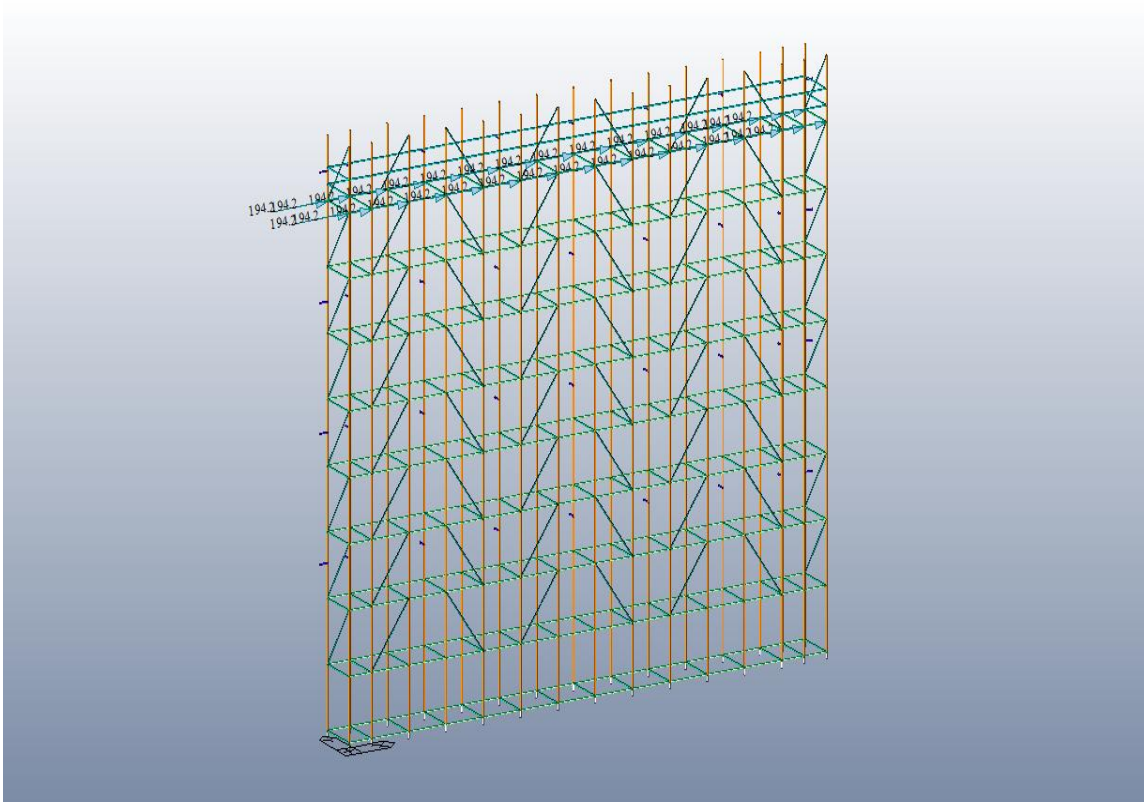
- D.L : Selfweight × 1.1 & 작업발판 0.2 kN/㎡



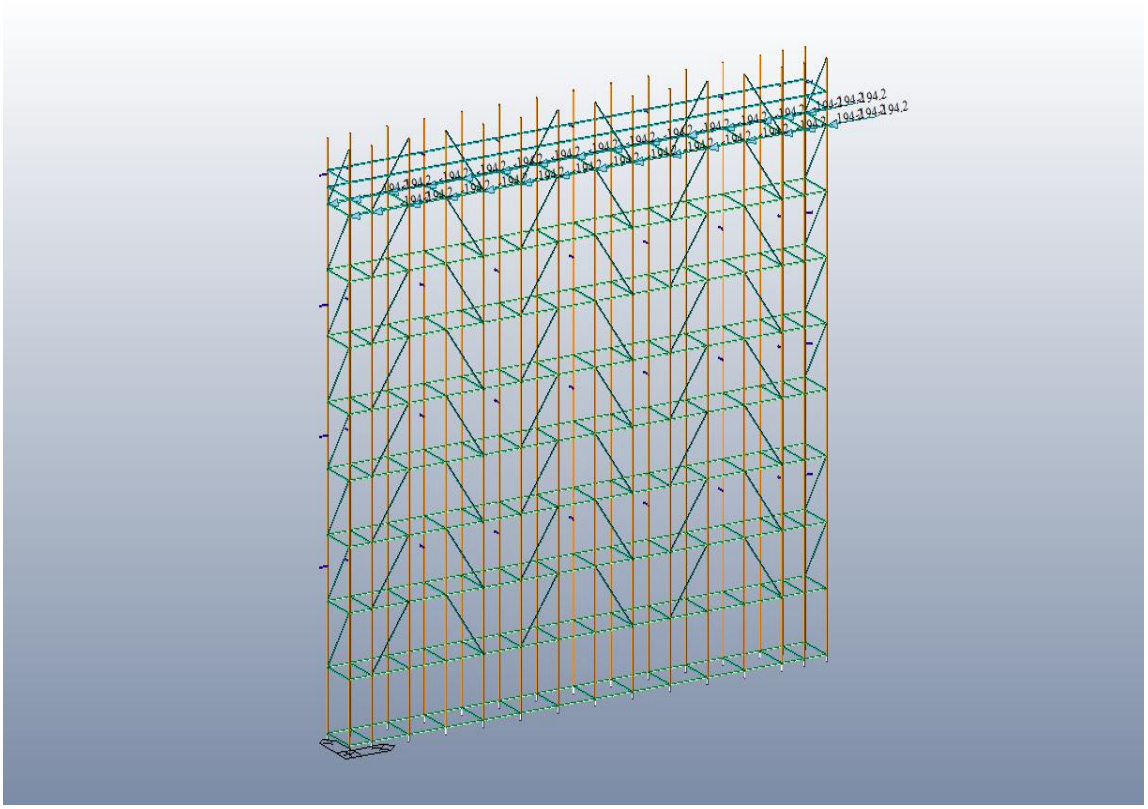
- L.L : 최상단 작업발판 1.25 kN/㎡



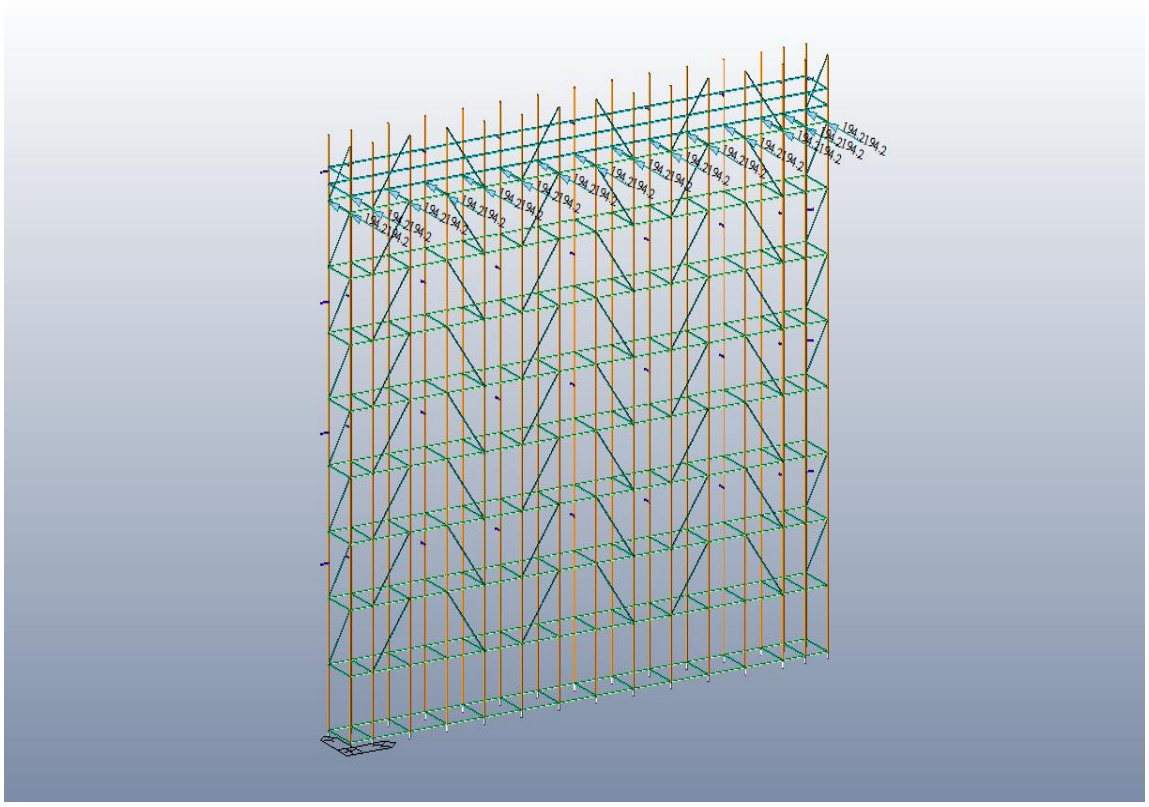
- Mx-Dir(+) : 194.20 N



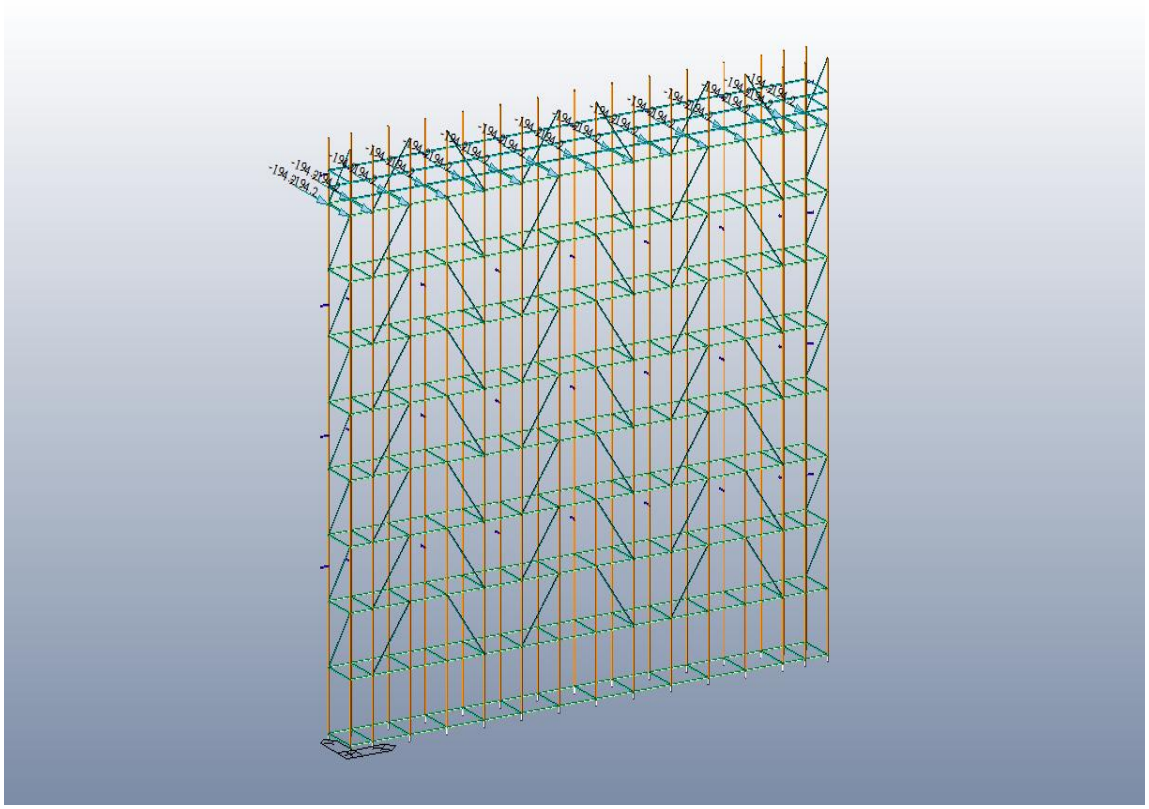
- Mx-Dir(-) : 194.20 N



- My-Dir(+) : 194.20 N



- Mx-Dir(-) : 194.20 N



3. 부재 설계

3.1. 부재력 확인

(1) 부재 설계 근거

			MAX.		MIN.	
1)	S.F.D(Y-DIR.)_CBSmax	:	0.4873	kN	-0.0052	kN
2)	S.F.D(Z-DIR.)_CBSmax	:	0.9867	kN	-0.2009	kN
3)	S.F.D(AXIAL)_CBSmax	:	1.4432	kN	-2.8593	kN
4)	S.F.D(MOMENT)_CBSmax	:	0.3423	kN·m	-0.0091	kN·m
5)	S.F.D(Y-DIR.)_CBSmin	:	0.0073	kN	-0.4922	kN
6)	S.F.D(Z-DIR.)_CBSmin	:	0.2011	kN	-0.9847	kN
7)	S.F.D(AXIAL)_CBSmin	:	0.1946	kN	-8.0599	kN
8)	S.F.D(MOMENT)_CBSmin	:	0.0678	kN·m	-0.2970	kN·m

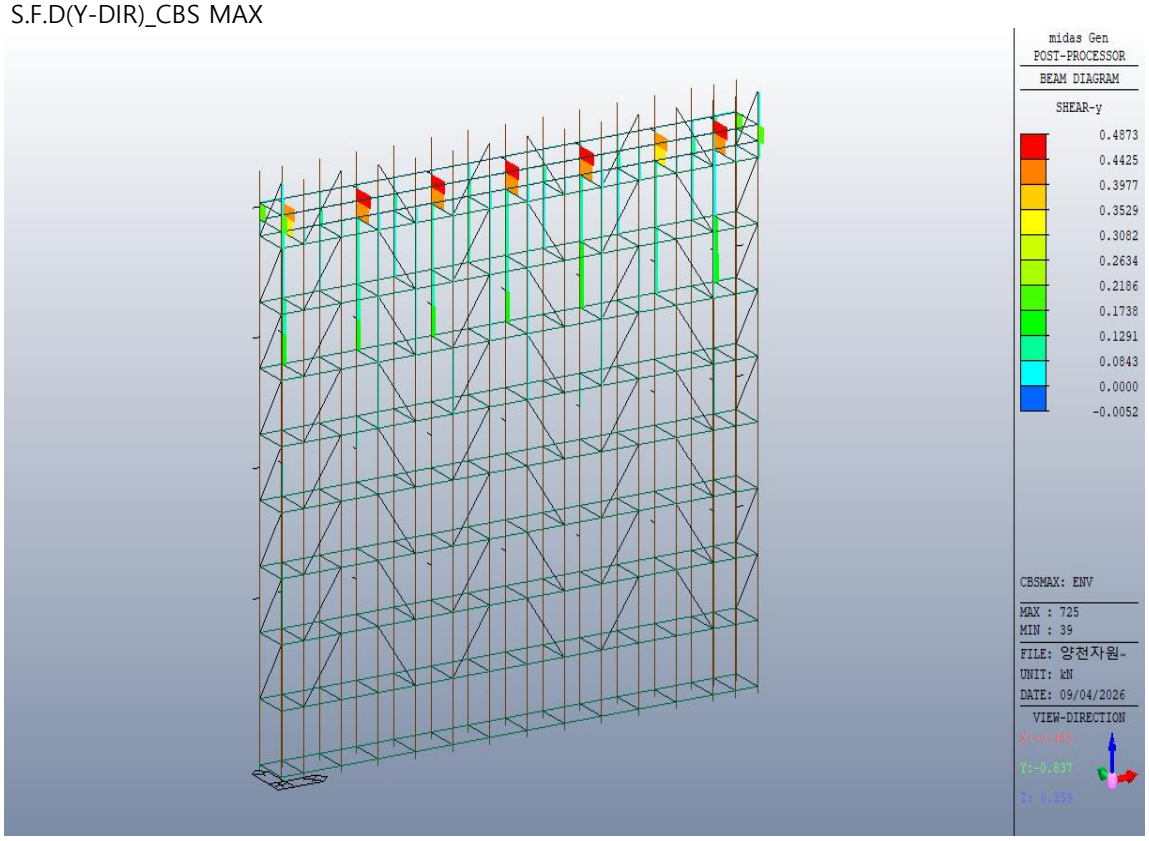
3.2. 반력 확인

			MAX.		MIN.	
1)	REACTION_CBSmax (Z-DIR.)	:	8.0599	kN	2.9285	kN
2)	REACTION_CBSmin (Z-DIR.)	:	2.8593	kN	0.6399	kN
3)	REACTION_LCB1	:	5.4579	kN	1.9925	kN

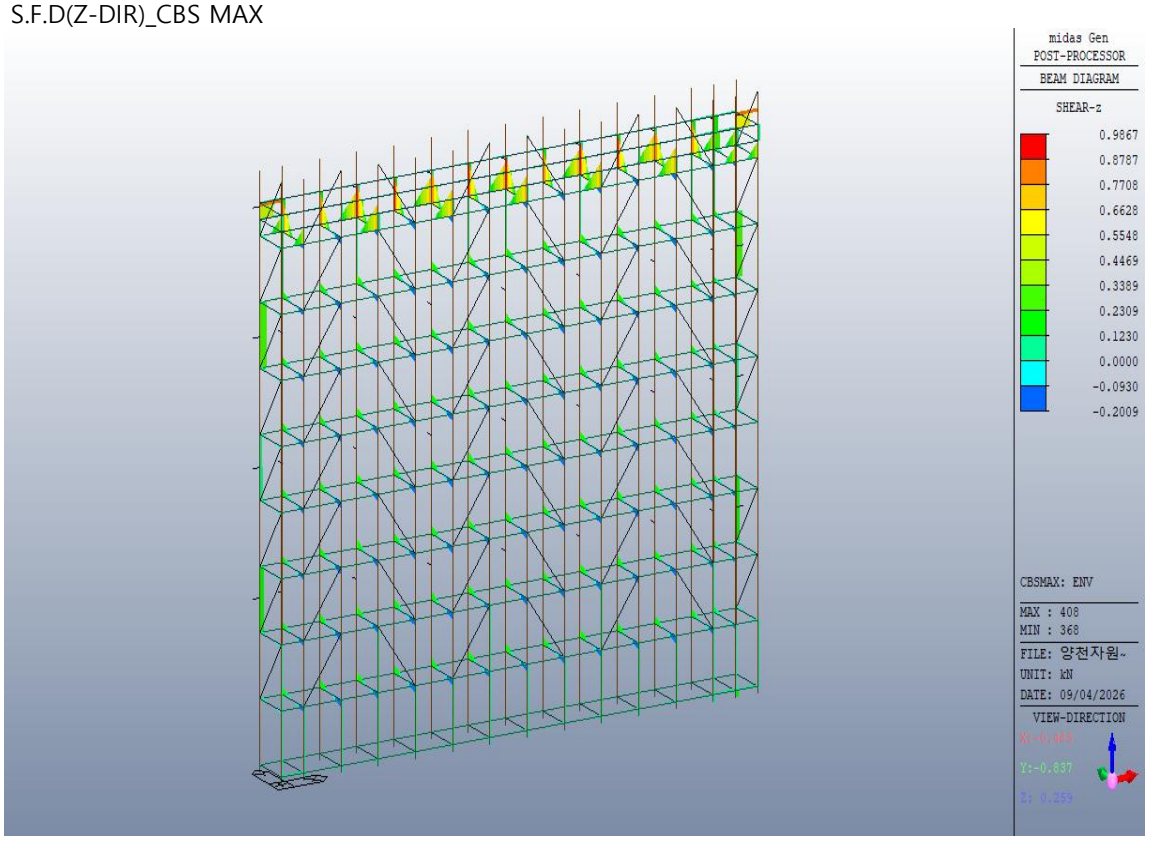
3.3. 처짐 확인

			MAX.		MIN.	
1)	DISPLACEMENT (X-DIR.)_CBSmax	:	14.2076	mm	0.0000	mm
2)	DISPLACEMENT (Y-DIR.)_CBSmax	:	21.0497	mm	0.0000	mm
3)	DISPLACEMENT (Z-DIR.)_CBSmax	:	3.0219	mm	-0.3214	mm
4)	DISPLACEMENT_CBSmax	:	25.3169	mm	0.0000	mm
5)	DISPLACEMENT (X-DIR.)_CBSmin	:	0.0000	mm	-14.2180	mm
6)	DISPLACEMENT (Y-DIR.)_CBSmin	:	0.0000	mm	-14.9517	mm
7)	DISPLACEMENT (Z-DIR.)_CBSmin	:	0.0000	mm	-3.9577	mm
8)	DISPLACEMENT_CBSmin	:	20.6599	mm	0.0000	mm

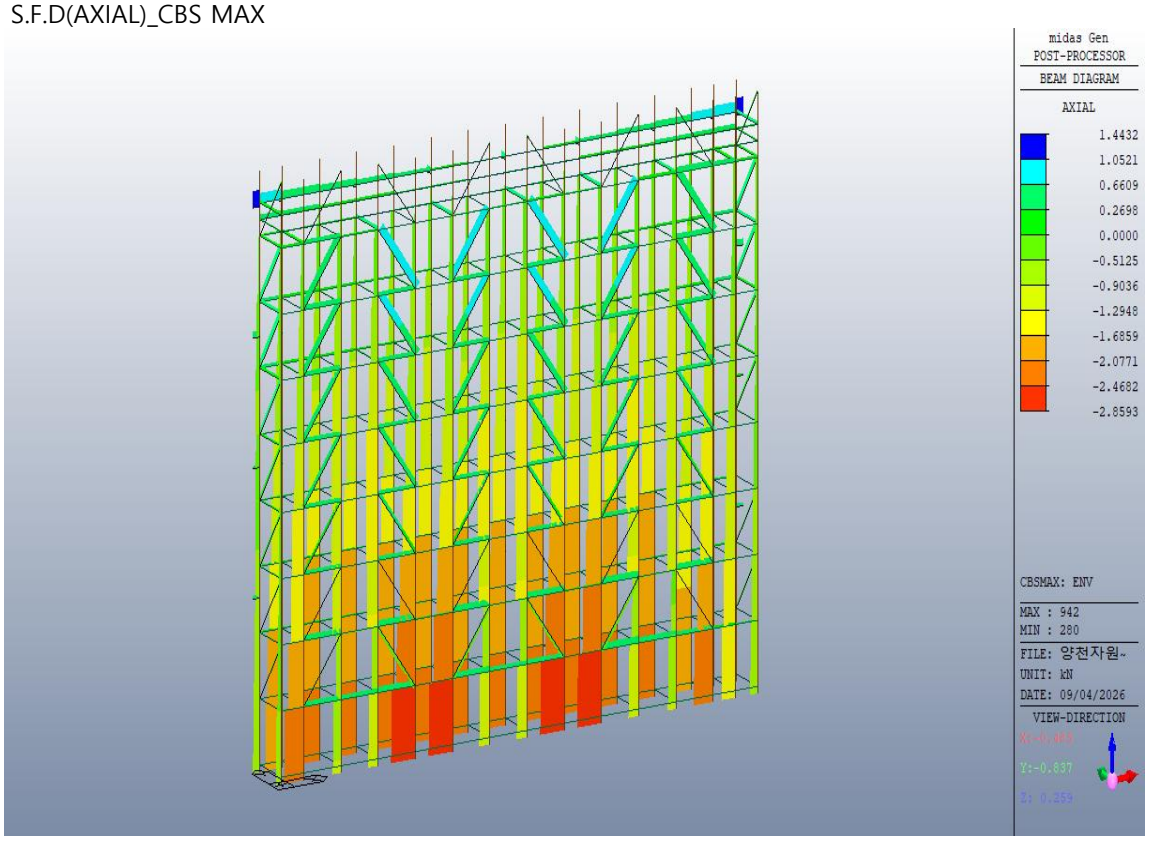
- S.F.D(Y-DIR)_CBS MAX



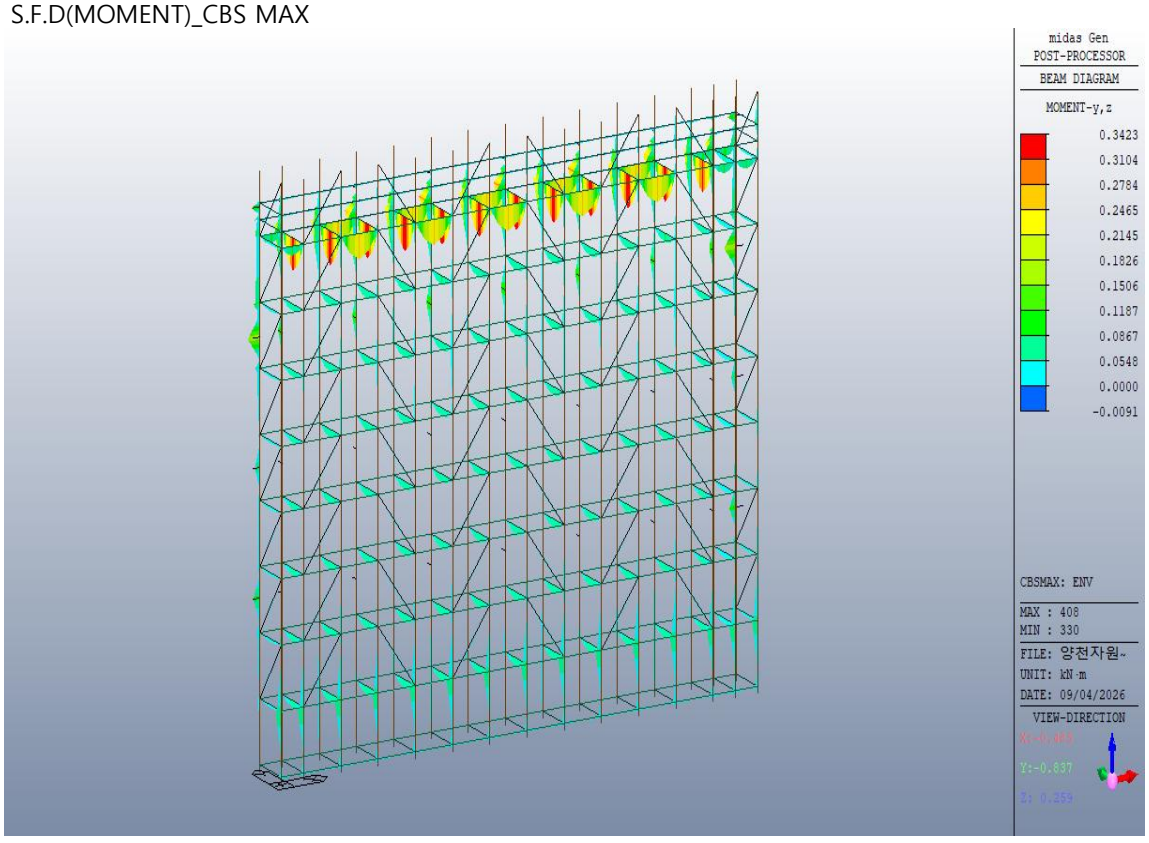
- S.F.D(Z-DIR)_CBS MAX



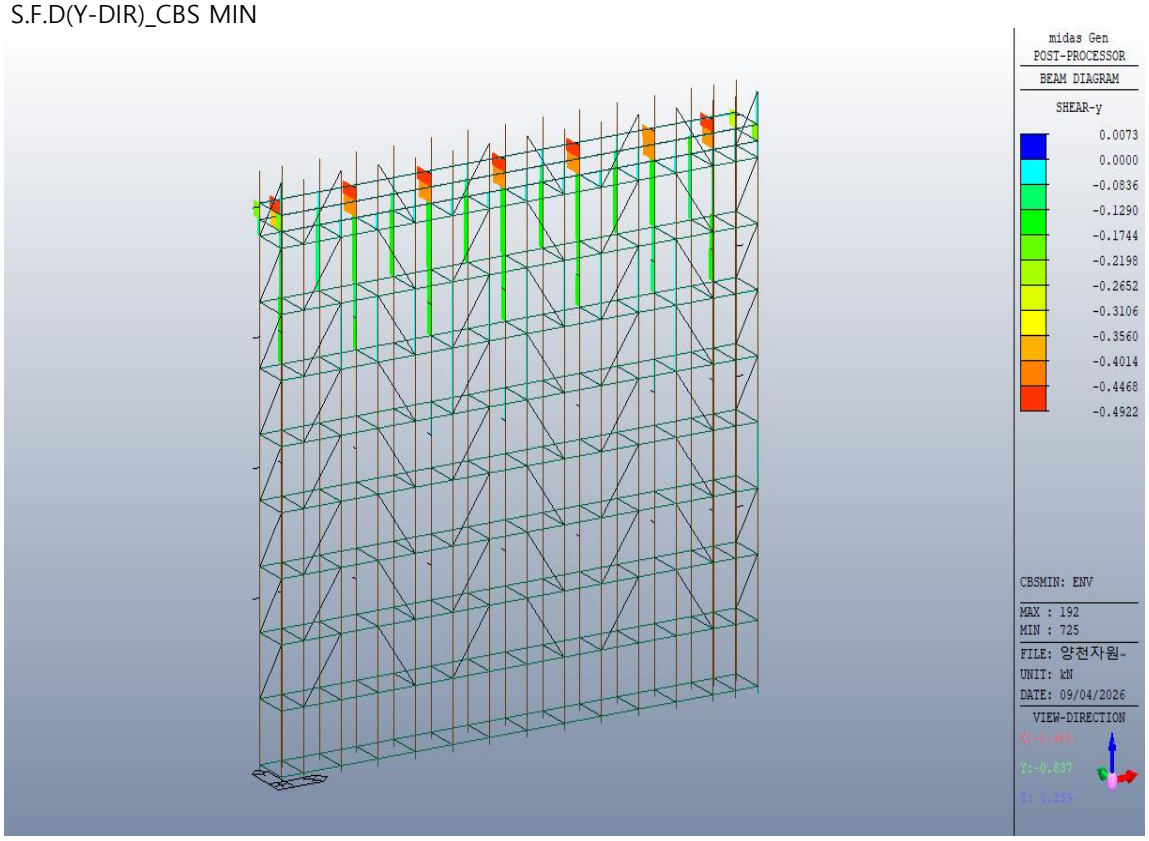
- S.F.D(AXIAL)_CBS MAX



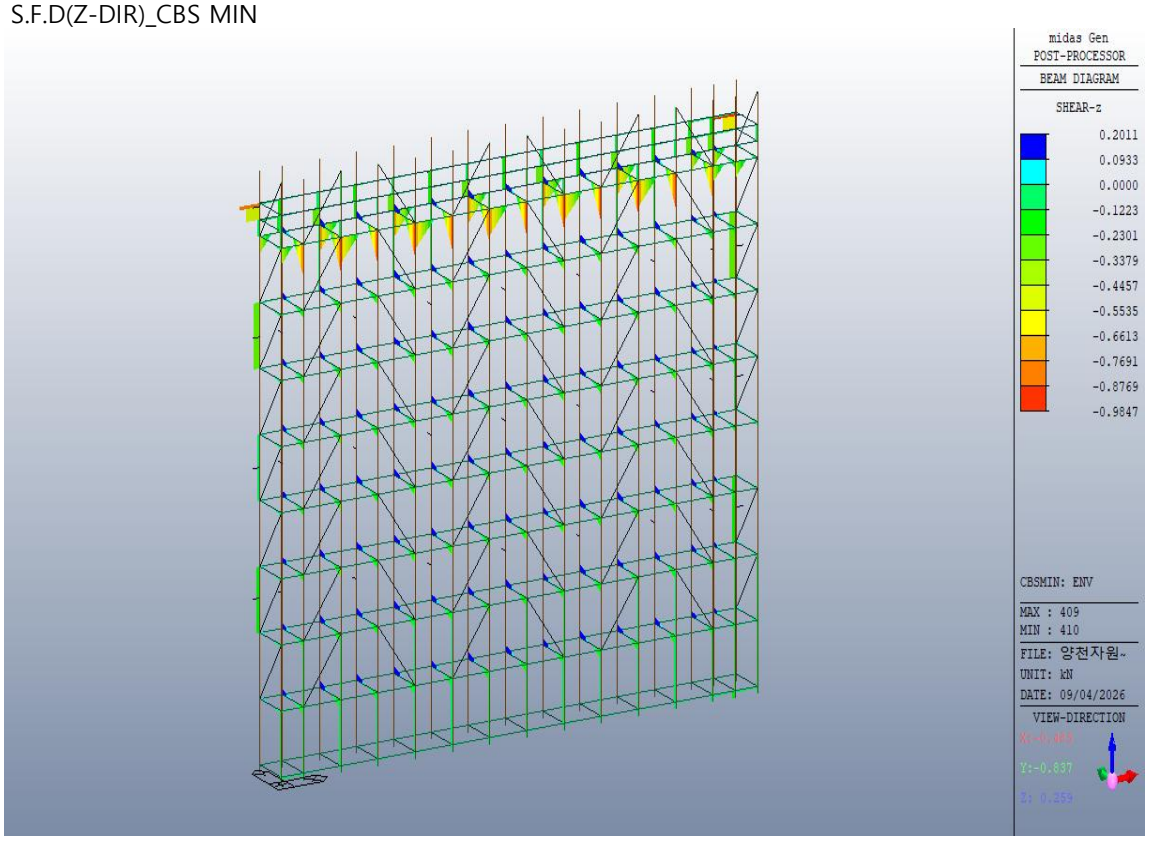
- S.F.D(MOMENT)_CBS MAX



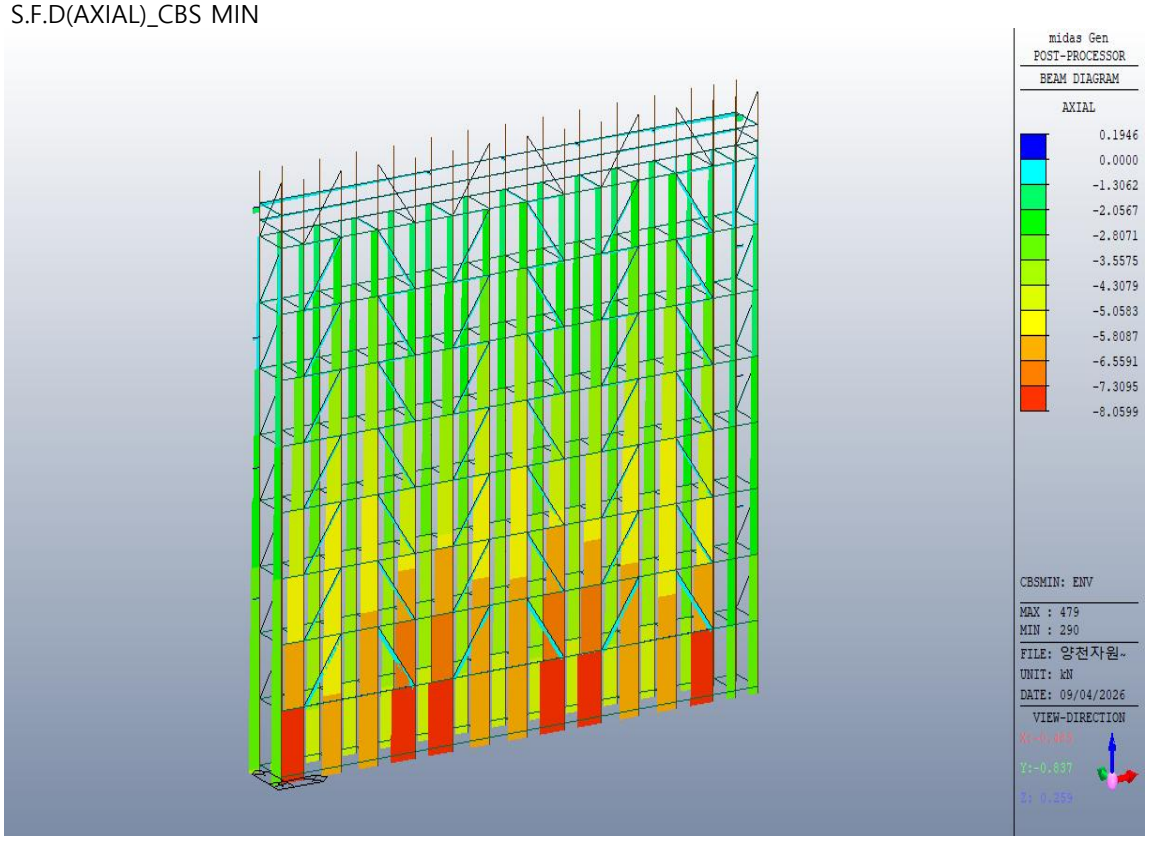
- S.F.D(Y-DIR)_CBS MIN



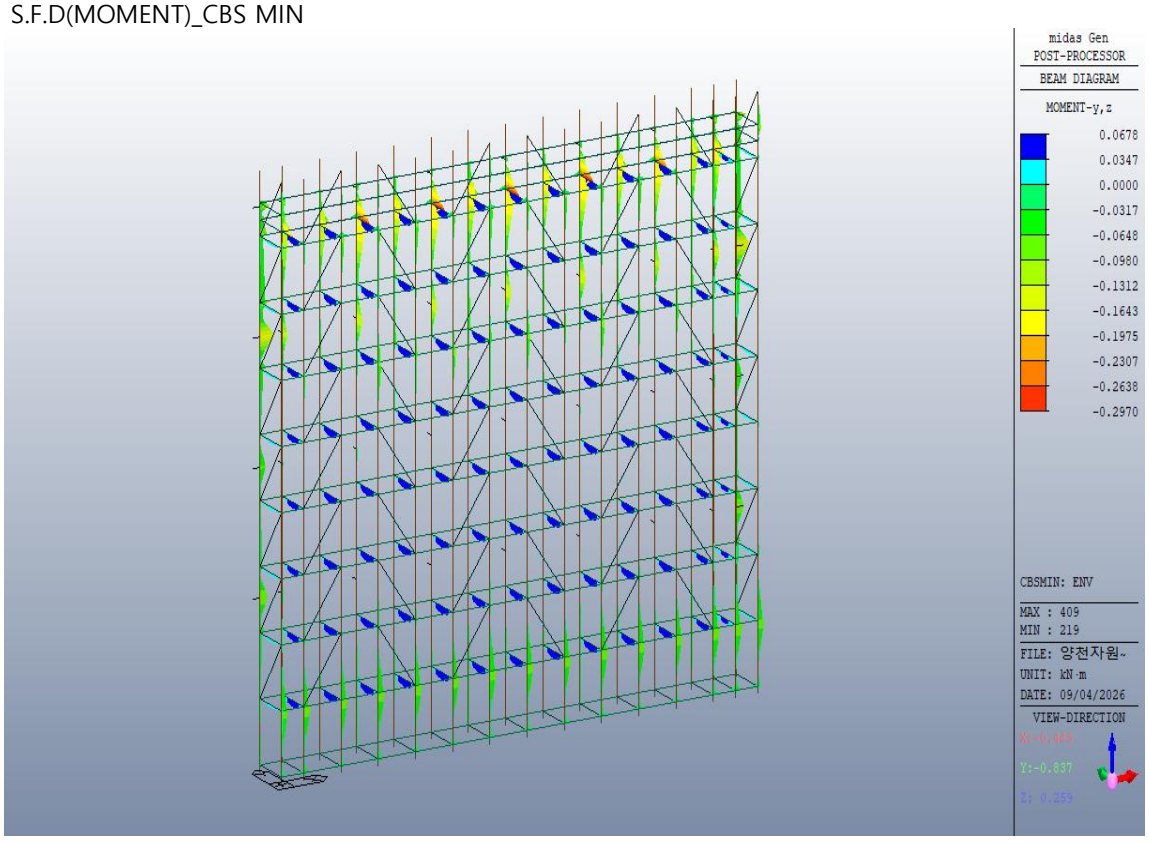
- S.F.D(Z-DIR)_CBS MIN



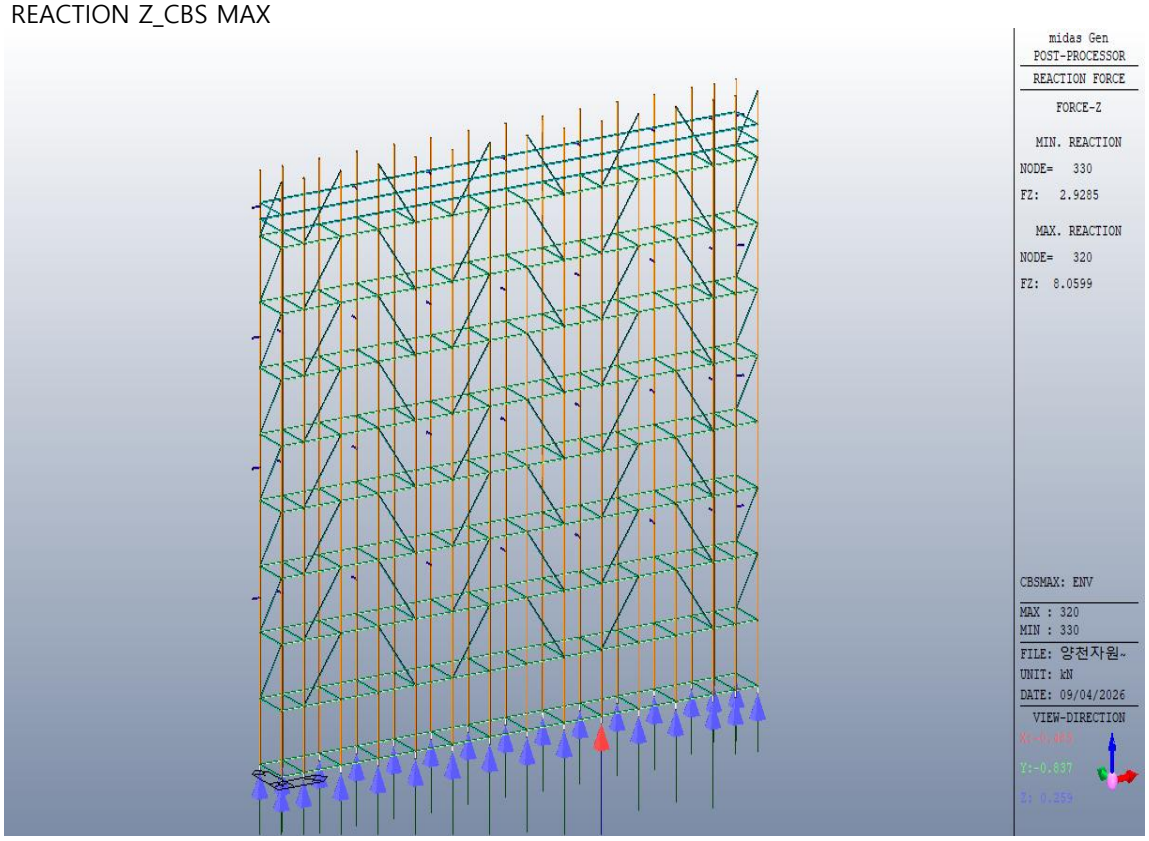
- S.F.D(AXIAL)_CBS MIN



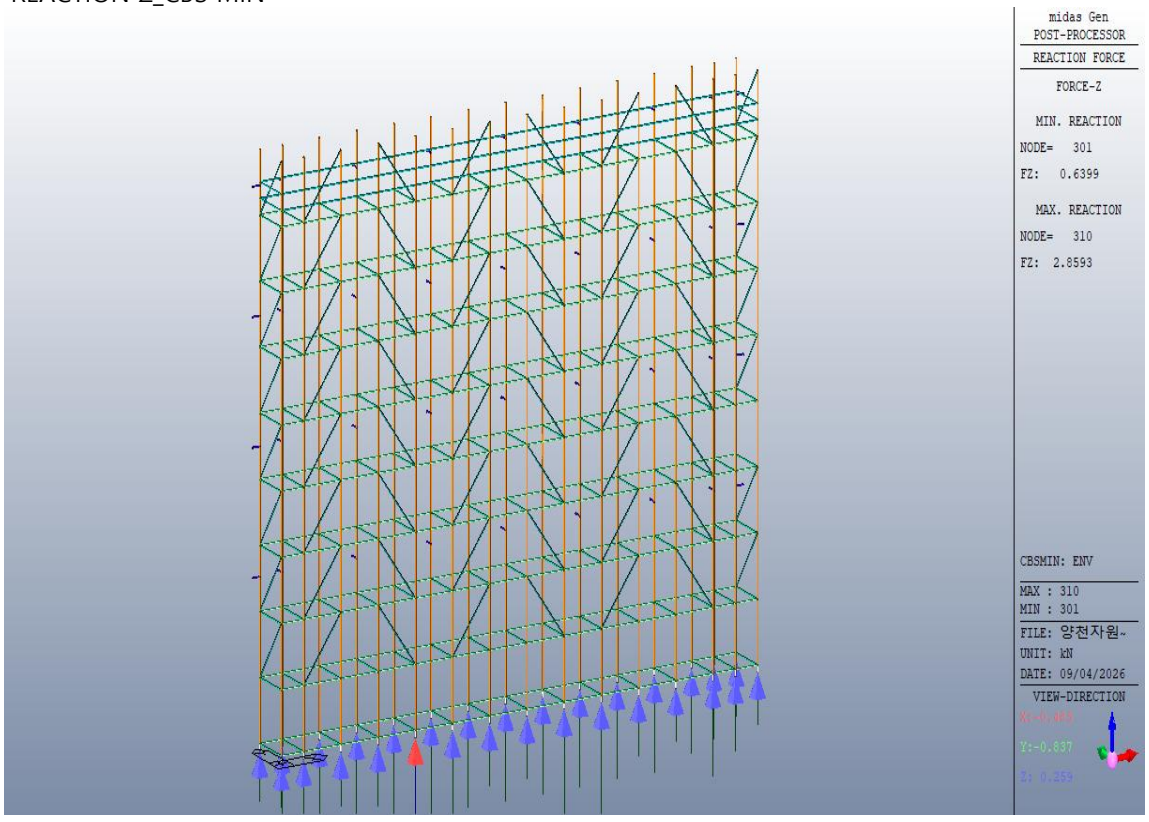
- S.F.D(MOMENT)_CBS MIN



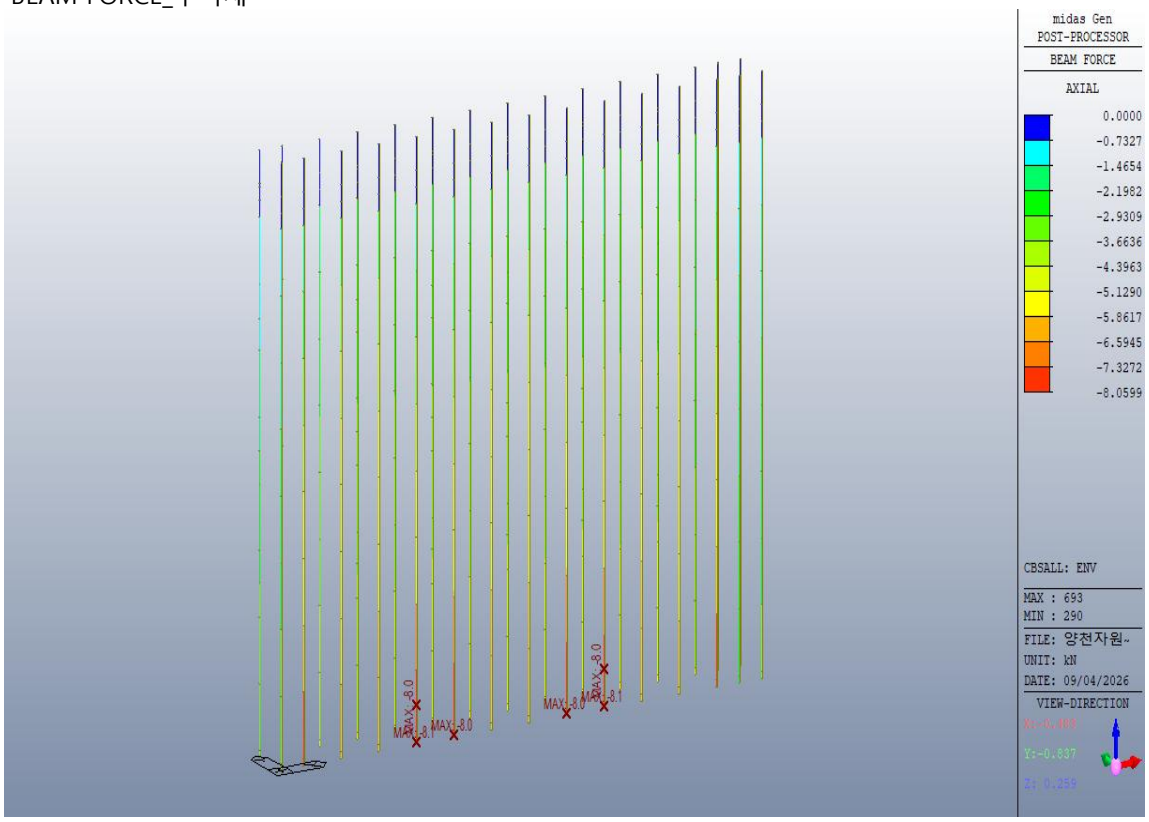
- REACTION Z_CBS MAX



- REACTION Z_CBS MIN



- BEAM FORCE_수직재



1) 수직재의 압축성능

- KDS 210 50 00(2.6) 표 2.6-2.

호칭길이(mm)	압축성능 (kN)	
	1종	2종
1,800 이상 2,100 미만	70	30

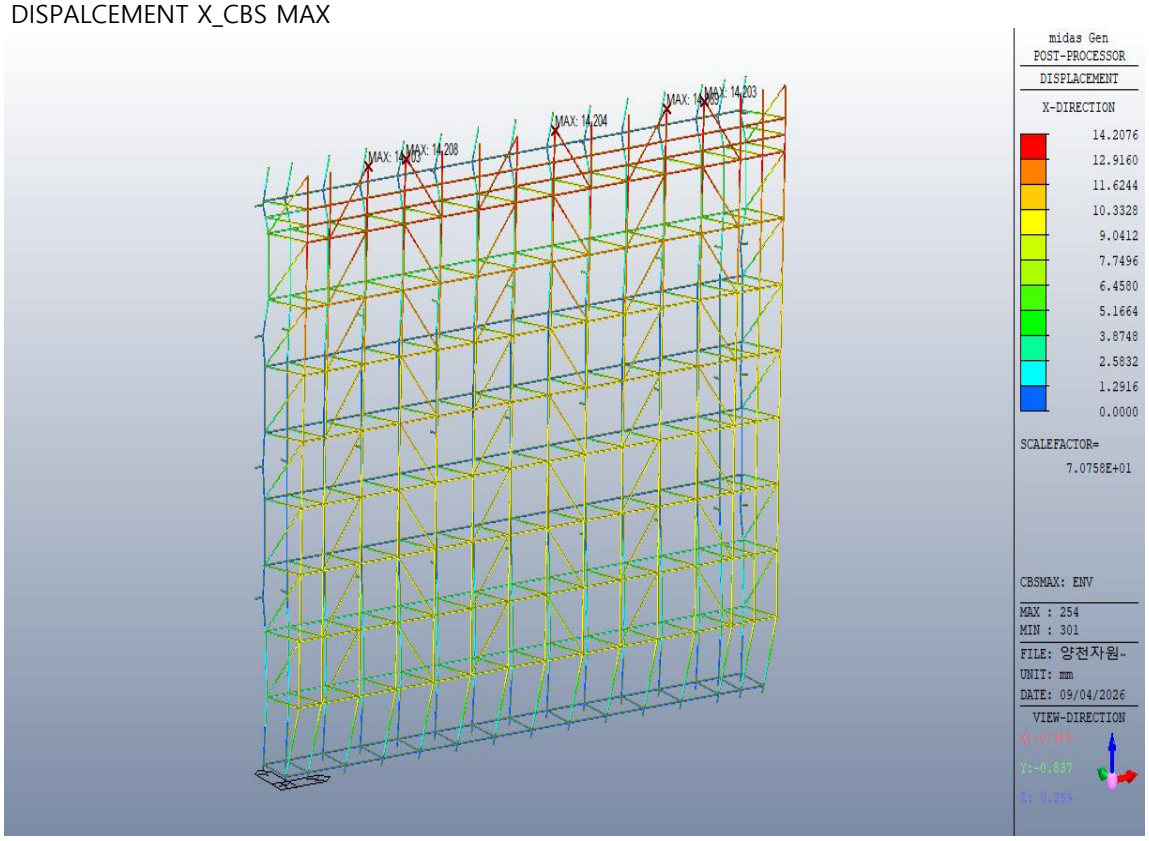
2) 수직재 작용 압축력

Elem	Load	Axial (kN)	Shear-y (kN)	Shear-z (kN)	Torsion (kN·mm)	Moment-y (kN·mm)	Moment-z (kN·mm)
280 (L : 1.9m)	LCB2	-8.06	-0.01	0.06	0	0	0
290 (L : 1.9m)	LCB3	-8.06	-0.01	-0.05	0	0	0

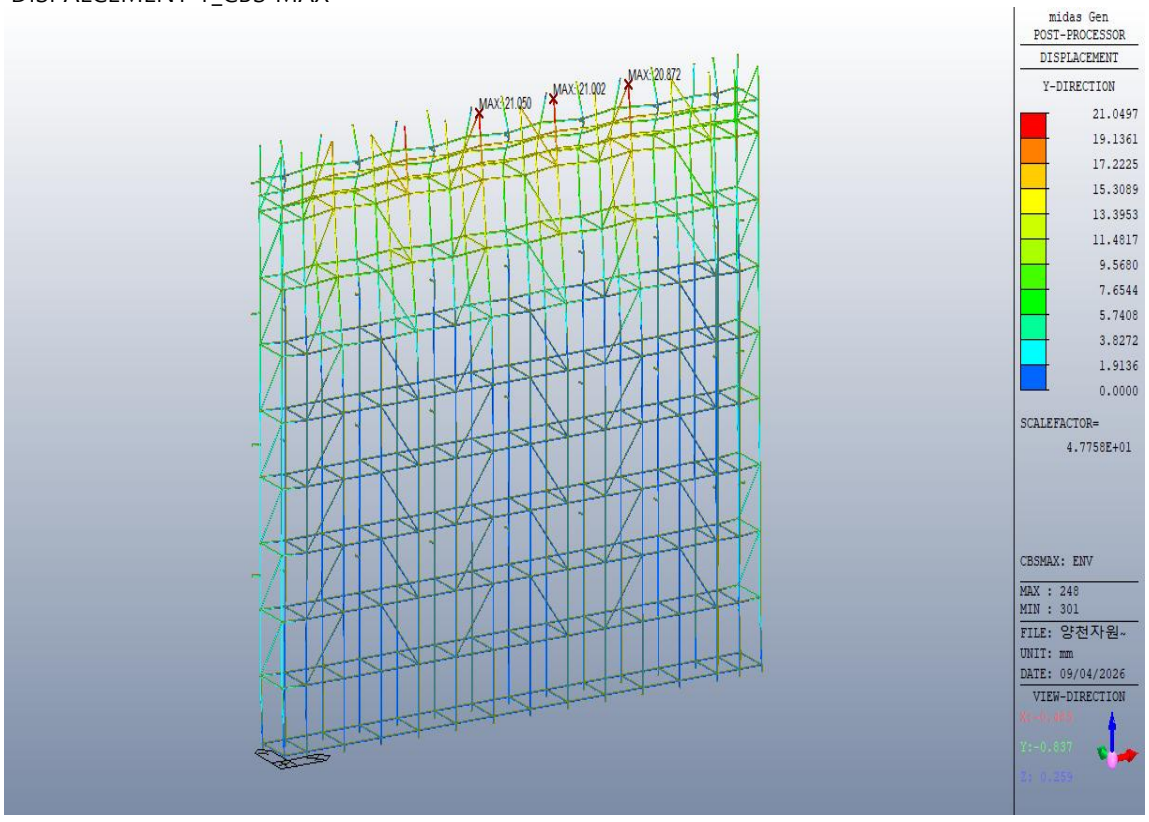
3) 검토 결과

- Length 1.9m 부재에 작용하는 축력 8.06 < 70.00 ---------- O.K

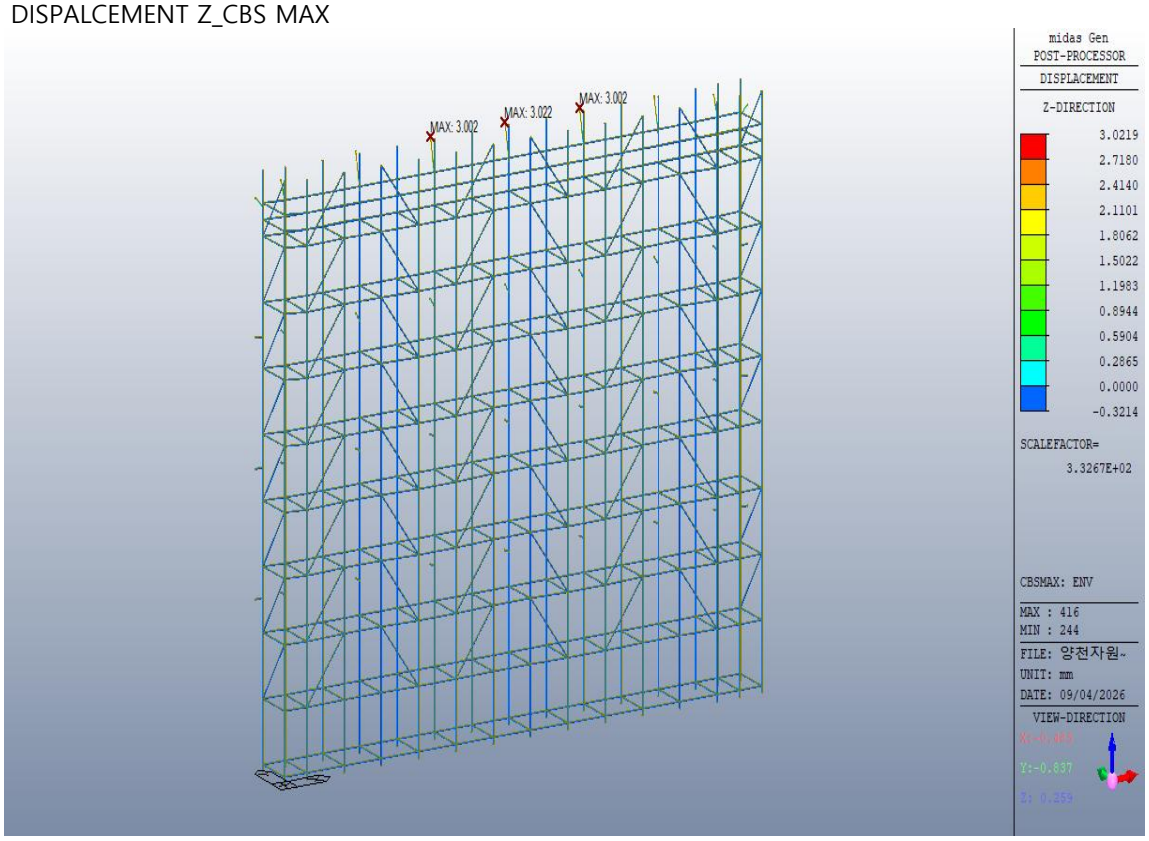
- DISPALCEMENT X_CBS MAX



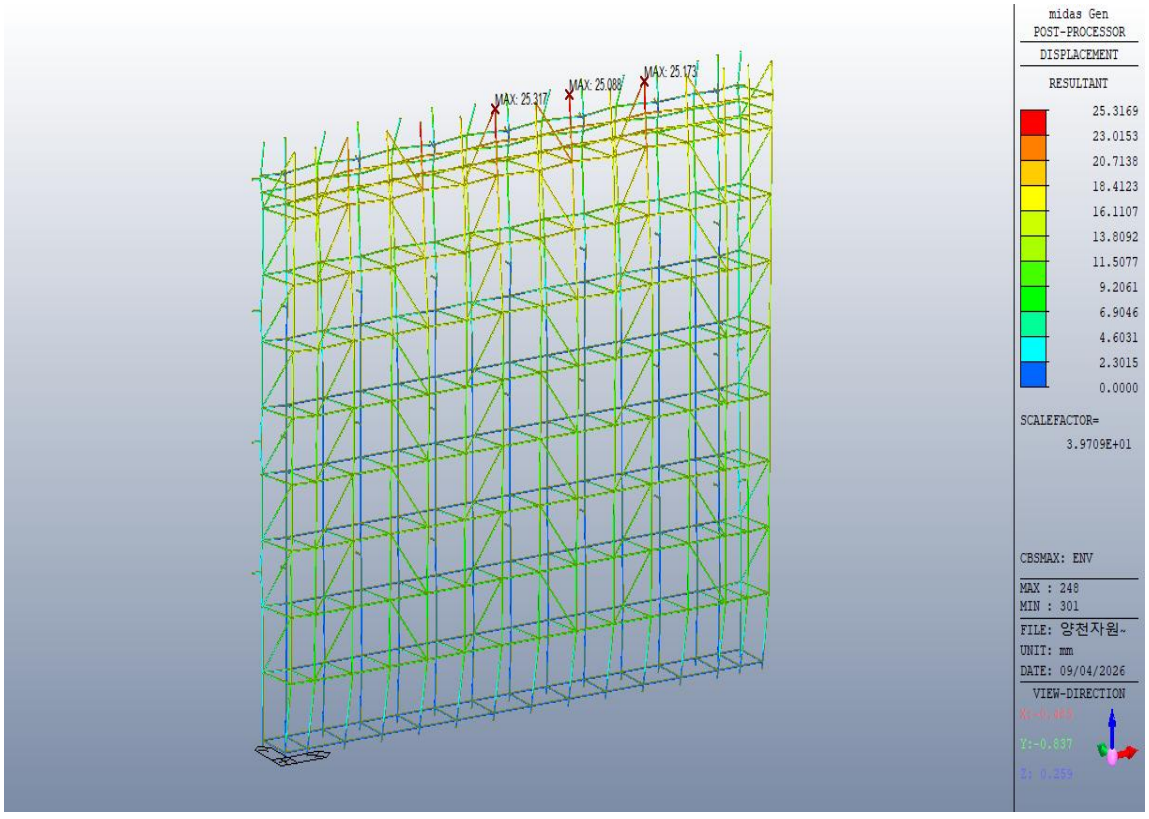
- DISPALCEMENT Y_CBS MAX



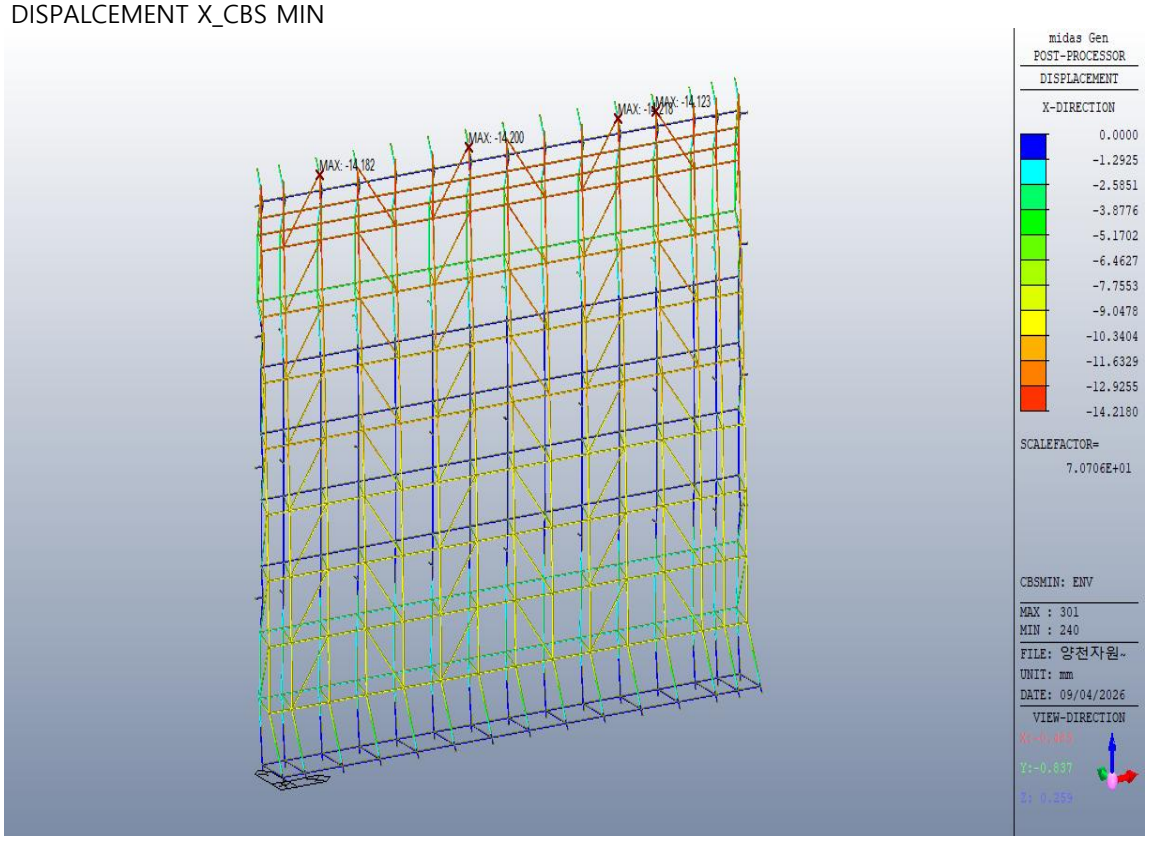
- DISPALCEMENT Z_CBS MAX



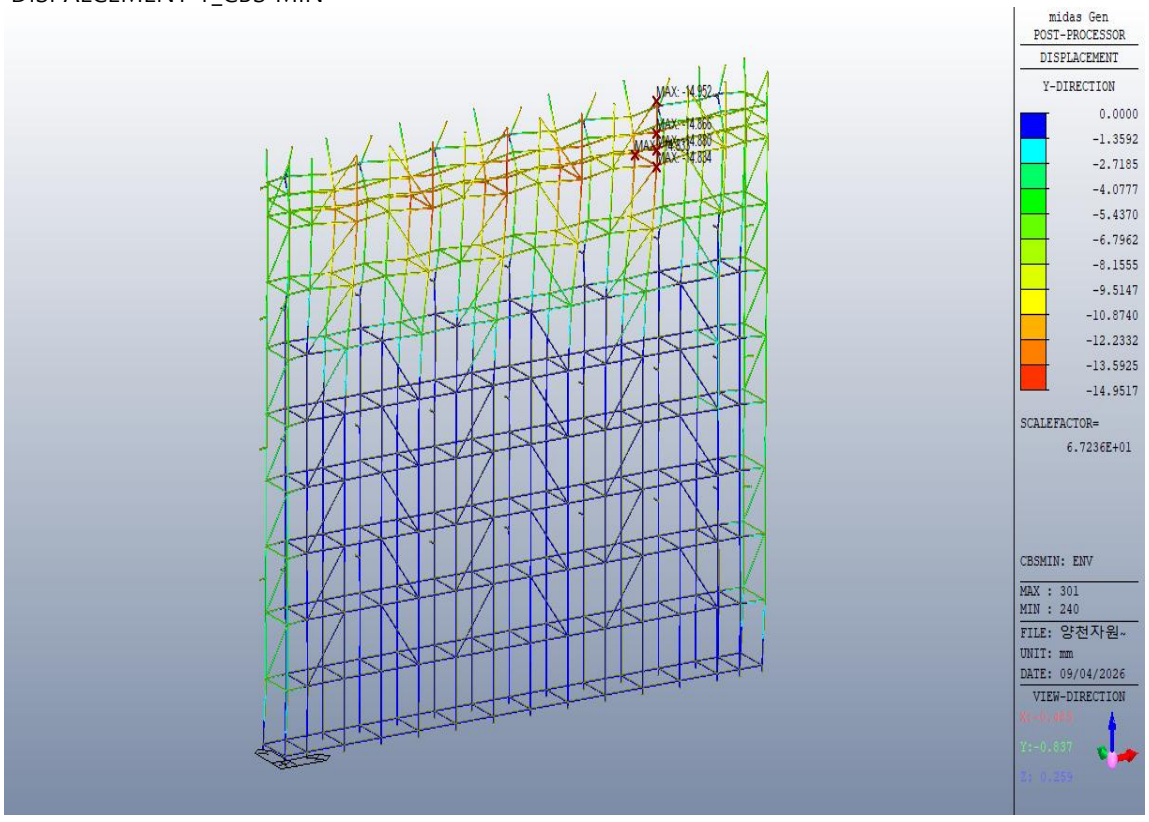
- DISPALCEMENT CBS MAX



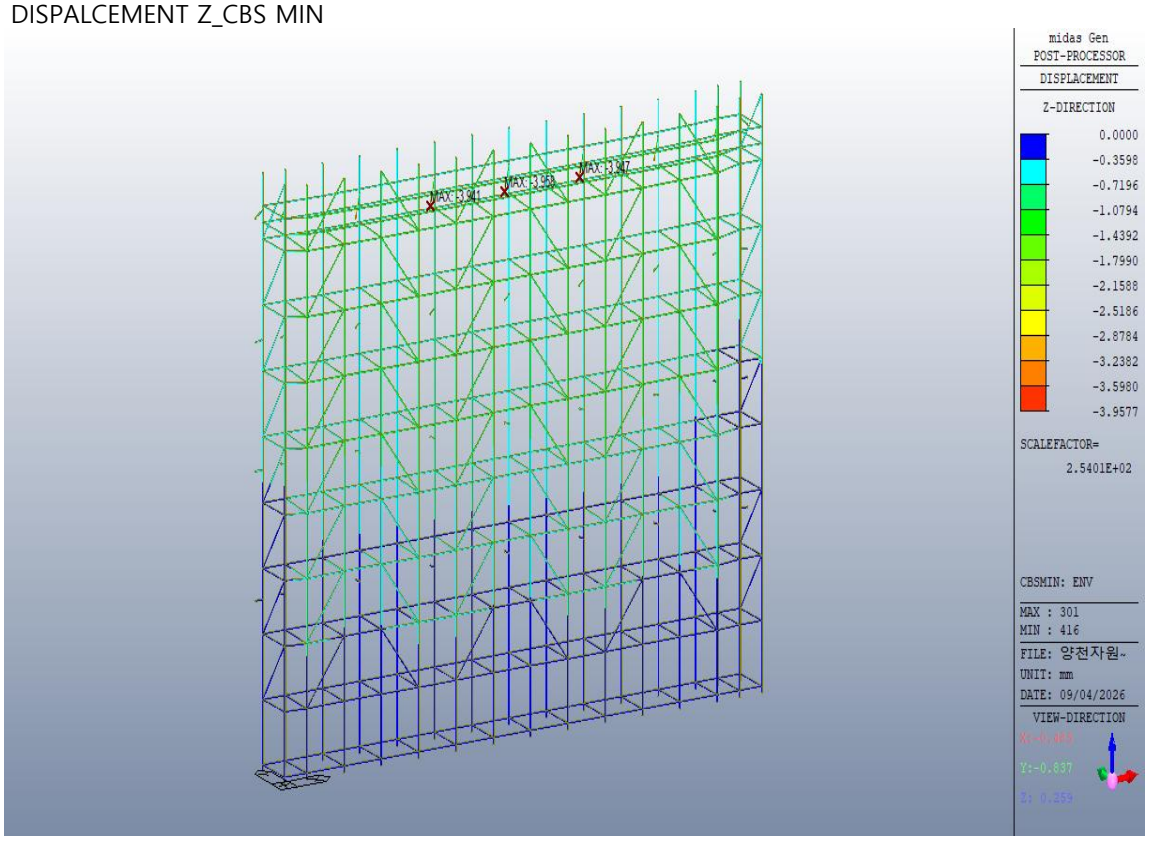
- DISPALCEMENT X_CBS MIN



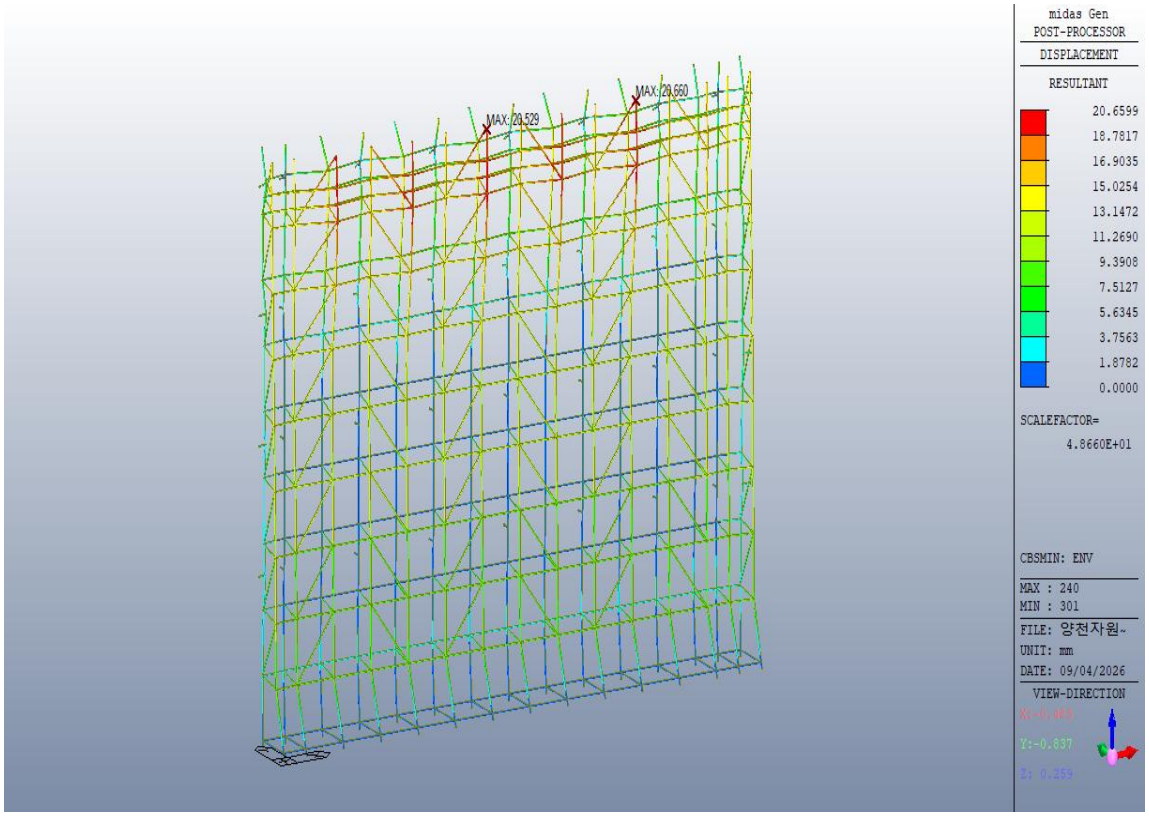
- DISPALCEMENT Y_CBS MIN



- DISPALCEMENT Z_CBS MIN

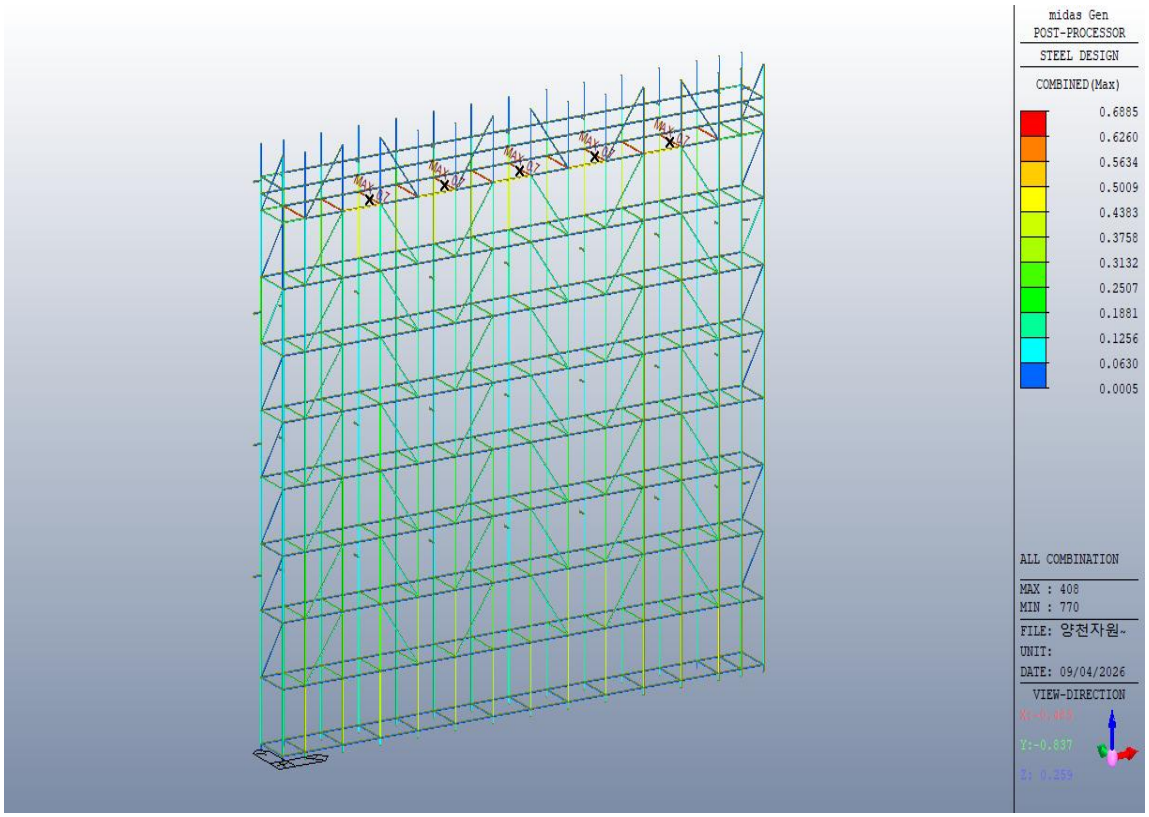


- DISPALCEMENT CBS MIN



4. 구조 해석

4.1. 부재안전성 검토(Safety Ability Check)



- STEEL CODE CHECKING RESULT

midas Gen — Steel Code Checking Result

Certified by :				
PROJECT TITLE :	양천자원회수시설			
MIDAS	Company		Client	
	Author		File Name	양천자원회수시설.acs

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------------------------------------------------------------------------------------------
midas Gen - Steel Code Checking    [ KSSC-ASD03 ]                          Gen 2025
==========================================================================================

        +=========================================================+
        |  MIDAS(Modeling, Integrated Design & Analysis Software)  |
        |  midas Gen - Design & checking system for windows        |
        +=========================================================+
        |  Steel Member Applicable Code Checking                   |
        |  Based On  KDS 41 30 : 2022, KDS 41 31 : 2019,           |
        |            KSSC-LSD16, KSSC-LSD09, KSSC-ASD03,           |
        |            AIK-LSD97, AIK-ASD83, KSCE-ASD96,             |
        |            AISC(15th)-LRFD16, AISC(15th)-ASD16,          |
        |            AISC(14th)-LRFD10, AISC(14th)-ASD10,          |
        |            AISC(13th)-LRFD05, AISC(13th)-ASD05,          |
        |            AISC-LRFD2K, AISC-LRFD93, AISC-ASD89,         |
        |            GB50017-03, GBJ17-88, BS5950-2K, BS5950-90,   |
        |            Eurocode3:05, Eurocode3, CSA-S16-01,          |
        |            AIJ-ASD02, IS:800-2007, IS:800-1984,          |
        |            TWN-ASD96, TWN-LSD96, TWN-ASD90, TWN-LSD90,   |
        |            NSCP 2015(LRFD), NSCP 2015(ASD)               |
        |                                                          |
        |                                        (c)SINCE 1989     |
        +=========================================================+
        |  MIDAS Information Technology Co.,Ltd.        (MIDAS IT)  |
        |  MIDAS IT Design Development Team                        |
        +=========================================================+
        |            HomePage : www.MidasUser.com                  |
        +=========================================================+
        |  Gen 2025                                                |
        +=========================================================+

    *. DEFINITION OF LOAD COMBINATIONS WITH SCALING UP FACTORS.
------------------------------------------------------------------------------------------
     LCB  C    Loadcase Name(Factor) + Loadcase Name(Factor) + Loadcase Name(Factor)
------------------------------------------------------------------------------------------
       1  1              DD( 1.000) +           LL( 1.000)
       2  1              DD( 1.000) +           LL( 1.000) +        Mx(+)( 1.000)
       3  1              DD( 1.000) +           LL( 1.000) +        Mx(-)( 1.000)
       4  1              DD( 1.000) +           LL( 1.000) +        My(+)( 1.000)
       5  1              DD( 1.000) +           LL( 1.000) +        My(-)( 1.000)
------------------------------------------------------------------------------------------

KDS 21 10 00 : 2022 가시설물 설계 일반사항

3. 설계하중 및 하중조합

3.3.1 거푸집 및 동바리, 비계 및 안전시설물

표 3.3-1 거푸집 및 동바리 등의 하중조합 및 허용응력증가계수

|   CASE   |       하중조합        |   허용응력증가계수   |
|     1    |       D + L + M       |        1.00          |
|     2    |       D + W           |        1.25          |
|     3    |       D + L + M + S   |        1.50          |
```

- STEEL CODE CHECKING RESULT

midas Gen — Steel Code Checking Result

Certified by :

PROJECT TITLE : 양천자원회수시설

MIDAS	Company		Client	
	Author		File Name	양천자원회수시설.acs

midas Gen - Steel Code Checking [KSSC-ASD03] Gen 2025

*.PROJECT : 양천자원회수시설
*.UNIT SYSTEM : kN, mm

[KSSC-ASD03] CODE CHECKING SUMMARY SHEET --- SELECTED MEMBERS IN ANALYSIS MODEL.

MEMB	SECT	Section			Len	Ly	Lz	Lb	Ky	Cmy	fa	fby	fbz	fvy	fvz
CHK	COM	SHR	Material	Fy	LCB	Pa	My	Mz	Cb	Kz	Cmz	Fa	FBy	FBz	Fvy	Fvz
8	1	수직재, P	48.6x2.3			1900.00	1900.00	1900.00	1900.00	1.00	0.85	0.0237	0.0227	0.0013	0.0002	0.0002
OK 0.41	0.00	SGT355	0.35500		3	-7.9440	84.1610	-4.8811	1.00	1.00	0.85	0.0806	0.2343	0.2343	0.1420	0.1420
408	2	장선재, P	42.7x2.3			1524.00	1524.00	1524.00	1524.00	1.00	1.00	0.0013	0.1224	0.0001	0.0034	0.0034
OK 0.69	0.03	SGT275	0.27500		4	-0.3665	342.341	-0.2381	1.00	1.00	1.00	0.0897	0.1815	0.1815	0.1100	0.1100
684	3	띠장재, P	42.7x2.3			1524.00	1524.00	1524.00	1524.00	1.00	1.00	0.0007	0.0894	0.0001	0.0026	0.0026
OK 0.50	0.02	SGT275	0.27500		3	-0.1986	249.979	0.22531	1.00	1.00	1.00	0.0897	0.1815	0.1815	0.1100	0.1100
768	4	난간재, P	42.7x2.3			914.000	914.000	914.000	914.000	1.00	1.00	0.0000	0.0001	0.0129	0.0002	0.0002
OK 0.07	0.00	SGT275	0.27500		4	0.00785	-0.3912	36.0235	1.00	1.00	1.00	0.1650	0.1815	0.1815	0.1100	0.1100
808	5	경사재, P	42.7x2.3			2435.69	2435.69	2435.69	2435.69	1.00	1.00	0.0040	0.0029	0.0001	0.0001	0.0001
OK 0.12	0.00	SGT275	0.27500		3	-1.1622	8.16962	-0.1814	1.00	1.00	1.00	0.0373	0.1815	0.1815	0.1100	0.1100
942	6	벽이음, P	48.6x2.3			300.000	300.000	300.000	300.000	1.00	1.00	0.0043	0.0003	0.0000	0.0000	0.0000
OK 0.03	0.00	SGT275	0.27500		2	-1.4260	-1.2746	0.00000	1.00	1.00	1.00	0.1579	0.1815	0.1650	0.1100	0.1100

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- 2 / 2 -

4.1.1 수직재 부재력 확인

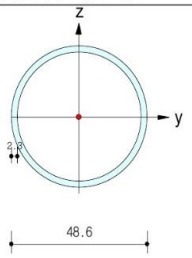
midas Gen **Steel Checking Result**

Certified by :

MIDAS	Company		Project Title	양천자원회수시설
	Author		File Name	양천자원회수시설.mgb

1. Design Information

Design Code KSSC-ASD03
Unit System kN, mm
Member No 8
Material SGT355 (No:2)
(Fy = 0.35500, Es = 210.000)
Section Name 수직재 (No:1)
(Rolled : P 48.6x2.3).
Member Length : 1900.00



2. Member Forces

Axial Force Fxx = -7.9440 (LCB: 3, POS:J)
Bending Moments My = 84.1610, Mz = -4.8811
End Moments Myi = -36.069, Myj = 84.1610 (for Lb)
Myi = -36.069, Myj = 84.1610 (for Ly)
Mzi = 2.05551, Mzj = -4.8811 (for Lz)
Shear Forces Fyy = 0.00366 (LCB: 3, POS:I)
Fzz = -0.0633 (LCB: 3, POS:I)

Outer Dia.	48.6000	Wall Thick	2.30000
Area	334.500	Asz	167.274
Qyb	537.245	Qzb	537.245
Iyy	89900.0	Izz	89900.0
Ybar	24.3000	Zbar	24.3000
Syy	3700.00	Szz	3700.00
ry	16.4000	rz	16.4000

3. Design Parameters

Unbraced Lengths Ly = 1900.00, Lz = 1900.00, Lb = 1900.00
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 0.85, Cmz = 0.85, Cb = 1.00

4. Checking Results

Slenderness Ratio
KL/r = 115.9 < 200.0 (Memb:8, LCB: 3)..... O.K
Axial Stress
fa/Fa = 0.02375/0.08057 = 0.295 < 1.000 ..... O.K
Bending Stresses
fby/Fby = 0.02275/0.23430 = 0.097 < 1.000 ..... O.K
fbz/Fbz = 0.00132/0.23430 = 0.006 < 1.000 ..... O.K
Combined Stress (Compression+Bending)
SFy = [Cmy/(1-fa/F'ey)], SFz = [Cmz/(1-fa/F'ez)]
Rmax1 = fa/Fa + SQRT[SFy*(fbcy/Fbcy)^2 + SFz*(fbcz/Fbcz)^2]
Rmax2 = fa/0.60Fy + SQRT[(fbcy/Fbcy)^2 + (fbcz/Fbcz)^2]
Rmax = Max[Rmax1, Rmax2] = 0.412 < 1.000 ..... O.K
Shear Stresses
fv/Fv = 0.001 < 1.000 ..... O.K

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4.1.2 장선재 부재력 확인

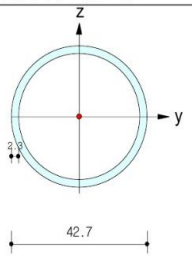
midas Gen **Steel Checking Result**

Certified by :

MIDAS	Company		Project Title	양천자원회수시설
	Author		File Name	양천자원회수시설.mgb

1. Design Information

Design Code KSSC-ASD03
Unit System kN, mm
Member No 408
Material SGT275 (No:1)
(Fy = 0.27500, Es = 210.000)
Section Name 장선재 (No:2)
(Rolled : P 42.7x2.3).
Member Length : 1524.00



2. Member Forces

Axial Force Fxx = -0.3665 (LCB: 4, POS:1/2)
Bending Moments My = 342.341, Mz = -0.2381
End Moments Myi = -35.583, Myj = -24.131 (for Lb)
Myi = -35.583, Myj = -24.131 (for Ly)
Mzi = -0.7992, Mzj = 0.32304 (for Lz)
Shear Forces Fyy = 0.00082 (LCB: 5, POS:J)
Fzz = 0.98669 (LCB: 5, POS:J)

Outer Dia.	42.7000	Wall Thick	2.30000
Area	291.900	Asz	145.958
Qyb	409.363	Qzb	409.363
Iyy	59700.0	Izz	59700.0
Ybar	21.3500	Zbar	21.3500
Syy	2800.00	Szz	2800.00
ry	14.3000	rz	14.3000

3. Design Parameters

Unbraced Lengths Ly = 1524.00, Lz = 1524.00, Lb = 1524.00
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Results

Slenderness Ratio
KL/r = 106.6 < 200.0 (Memb:408, LCB: 4)..... O.K
Axial Stress
fa/Fa = 0.00126/0.08972 = 0.014 < 1.000 ..... O.K
Bending Stresses
fby/Fby = 0.12243/0.18150 = 0.675 < 1.000 ..... O.K
fbz/Fbz = 0.00009/0.18150 = 0.000 < 1.000 ..... O.K
Combined Stress (Compression+Bending)
Rmax = fa/Fa + SQRT[(fbcy/Fbcy)^2 + (fbcz/Fbcz)^2] = 0.689 < 1.000 ..... O.K
Shear Stresses
fv/Fv = 0.031 < 1.000 ..... O.K

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4.1.3 띠장재 부재력 확인

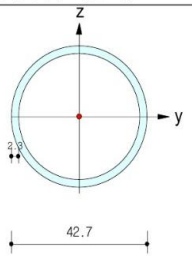
midas Gen **Steel Checking Result**

Certified by :

MIDAS	Company		Project Title	양천자원회수시설
	Author		File Name	양천자원회수시설.mgb

1. Design Information

Design Code KSSC-ASD03
Unit System kN, mm
Member No 684
Material SGT275 (No:1)
(Fy = 0.27500, Es = 210.000)
Section Name 띠장재 (No:3)
(Rolled : P 42.7x2.3).
Member Length : 1524.00



2. Member Forces

Axial Force Fxx = -0.1986 (LCB: 3, POS:1/2)
Bending Moments My = 249.979, Mz = 0.22531
End Moments Myi = -35.782, Myj = -31.675 (for Lb)
Myi = -35.782, Myj = -31.675 (for Ly)
Mzi = 5.00065, Mzj = -4.5500 (for Lz)
Shear Forces Fyy = -0.0060 (LCB: 2, POS:J)
Fzz = 0.74765 (LCB: 2, POS:J)

Outer Dia.	42.7000	Wall Thick	2.30000
Area	291.900	Asz	145.958
Qyb	409.363	Qzb	409.363
Iyy	59700.0	Izz	59700.0
Ybar	21.3500	Zbar	21.3500
Syy	2800.00	Szz	2800.00
ry	14.3000	rz	14.3000

3. Design Parameters

Unbraced Lengths Ly = 1524.00, Lz = 1524.00, Lb = 1524.00
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Results

Slenderness Ratio
KL/r = 106.6 < 200.0 (Memb:684, LCB: 3)..... O.K
Axial Stress
fa/Fa = 0.00068/0.08972 = 0.008 < 1.000 ..... O.K
Bending Stresses
fby/Fby = 0.08940/0.18150 = 0.493 < 1.000 ..... O.K
fbz/Fbz = 0.00008/0.18150 = 0.000 < 1.000 ..... O.K
Combined Stress (Compression+Bending)
Rmax = fa/Fa + SQRT[(fbcy/Fbcy)^2 + (fbcz/Fbcz)^2] = 0.500 < 1.000 ..... O.K
Shear Stresses
fv/Fv = 0.023 < 1.000 ..... O.K

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4.1.4 난간재 부재력 확인

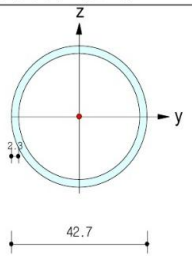
midas Gen **Steel Checking Result**

Certified by :

MIDAS	Company		Project Title	양천자원회수시설
	Author		File Name	양천자원회수시설.mgb

1. Design Information

Design Code KSSC-ASD03
Unit System kN, mm
Member No 768
Material SGT275 (No:1)
(Fy = 0.27500, Es = 210.000)
Section Name 난간재 (No:4)
(Rolled : P 42.7x2.3).
Member Length : 914.000



Outer Dia.	42.7000	Wall Thick	2.30000
Area	291.900	Asz	145.958
Qyb	409.363	Qzb	409.363
Iyy	59700.0	Izz	59700.0
Ybar	21.3500	Zbar	21.3500
Syy	2800.00	Szz	2800.00
ry	14.3000	rz	14.3000

2. Member Forces

Axial Force Fxx = 0.00785 (LCB: 4, POS:I)
Bending Moments My = -0.3912, Mz = 36.0235
End Moments Myi = -0.3912, Myj = -0.1958 (for Lb)
Myi = -0.3912, Myj = -0.1958 (for Ly)
Mzi = 36.0235, Mzj = -23.454 (for Lz)
Shear Forces Fyy = 0.06507 (LCB: 4, POS:I)
Fzz = -0.0115 (LCB: 4, POS:I)

3. Design Parameters

Unbraced Lengths Ly = 914.000, Lz = 914.000, Lb = 914.000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Results

Slenderness Ratio
KL/r = 106.6 < 200.0 (Memb:696, LCB: 1)..... O.K
Axial Stress
ft/Ft = 0.00003/0.16500 = 0.000 < 1.000 ..... O.K
Bending Stresses
fby/Fby = 0.00014/0.18150 = 0.001 < 1.000 ..... O.K
fbz/Fbz = 0.01288/0.18150 = 0.071 < 1.000 ..... O.K
Combined Stress (Tension+Bending)
Rmax = ft/Ft + SQRT[(fbty/Fbty)^2 + (fbtz/Fbtz)^2] = 0.071 < 1.000 ..... O.K
Shear Stresses
fv/Fv = 0.002 < 1.000 ..... O.K

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4.1.5 경사재 부재력 확인

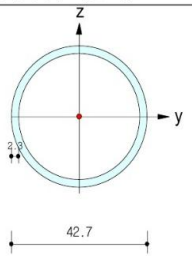
midas Gen **Steel Checking Result**

Certified by :

Company		Project Title	양천자원회수시설
Author		File Name	양천자원회수시설.mgb

1. Design Information

Design Code KSSC-ASD03
Unit System kN, mm
Member No 808
Material SGT275 (No:1)
(Fy = 0.27500, Es = 210.000)
Section Name 경사재 (No:5)
(Rolled : P 42.7x2.3).
Member Length : 2435.69



Outer Dia.	42.7000	Wall Thick	2.30000
Area	291.900	Asz	145.958
Qyb	409.363	Qzb	409.363
Iyy	59700.0	Izz	59700.0
Ybar	21.3500	Zbar	21.3500
Syy	2800.00	Szz	2800.00
ry	14.3000	rz	14.3000

2. Member Forces

Axial Force Fxx = -1.1622 (LCB: 3, POS:1/2)
Bending Moments My = 8.16962, Mz = -0.1814
End Moments Myi = -4.6988, Myj = -1.8982 (for Lb)
Myi = -4.6988, Myj = -1.8982 (for Ly)
Mzi = 1.24768, Mzj = -1.6087 (for Lz)
Shear Forces Fyy = 0.00117 (LCB: 3, POS:I)
Fzz = -0.0200 (LCB: 3, POS:I)

3. Design Parameters

Unbraced Lengths Ly = 2435.69, Lz = 2435.69, Lb = 2435.69
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Results

Slenderness Ratio
KL/r = 170.3 < 200.0 (Memb:808, LCB: 3)..... O.K
Axial Stress
fa/Fa = 0.00398/0.03727 = 0.107 < 1.000 ..... O.K
Bending Stresses
fby/Fby = 0.00292/0.18150 = 0.016 < 1.000 ..... O.K
fbz/Fbz = 0.00006/0.18150 = 0.000 < 1.000 ..... O.K
Combined Stress (Compression+Bending)
Rmax = fa/Fa + SQRT[(fbcy/Fbcy)^2 + (fbcz/Fbcz)^2] = 0.123 < 1.000 ..... O.K
Shear Stresses
fv/Fv = 0.001 < 1.000 ..... O.K

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4.1.6 벽이음

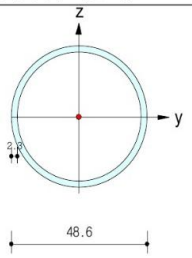
midas Gen **Steel Checking Result**

Certified by :

MIDAS	Company		Project Title	양천자원회수시설
	Author		File Name	양천자원회수시설.mgb

1. Design Information

Design Code KSSC-ASD03
Unit System kN, mm
Member No 942
Material SGT275 (No:1)
(Fy = 0.27500, Es = 210.000)
Section Name 벽이음 (No:6)
(Rolled : P 48.6x2.3).
Member Length : 300.000



2. Member Forces

Axial Force Fxx = -1.4260 (LCB: 2, POS:I)
Bending Moments My = -1.2746, Mz = 0.00000
End Moments Myi = -1.2746, Myj = 0.00000 (for Lb)
Myi = -1.2746, Myj = 0.00000 (for Ly)
Mzi = 0.00000, Mzj = 0.00000 (for Lz)
Shear Forces Fyy = 0.00000 (LCB: 5, POS:I)
Fzz = -0.0085 (LCB: 5, POS:I)

Outer Dia.	48.6000	Wall Thick	2.30000
Area	334.500	Asz	167.274
Qyb	537.245	Qzb	537.245
Iyy	89900.0	Izz	89900.0
Ybar	24.3000	Zbar	24.3000
Syy	3700.00	Szz	3700.00
ry	16.4000	rz	16.4000

3. Design Parameters

Unbraced Lengths Ly = 300.000, Lz = 300.000, Lb = 300.000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

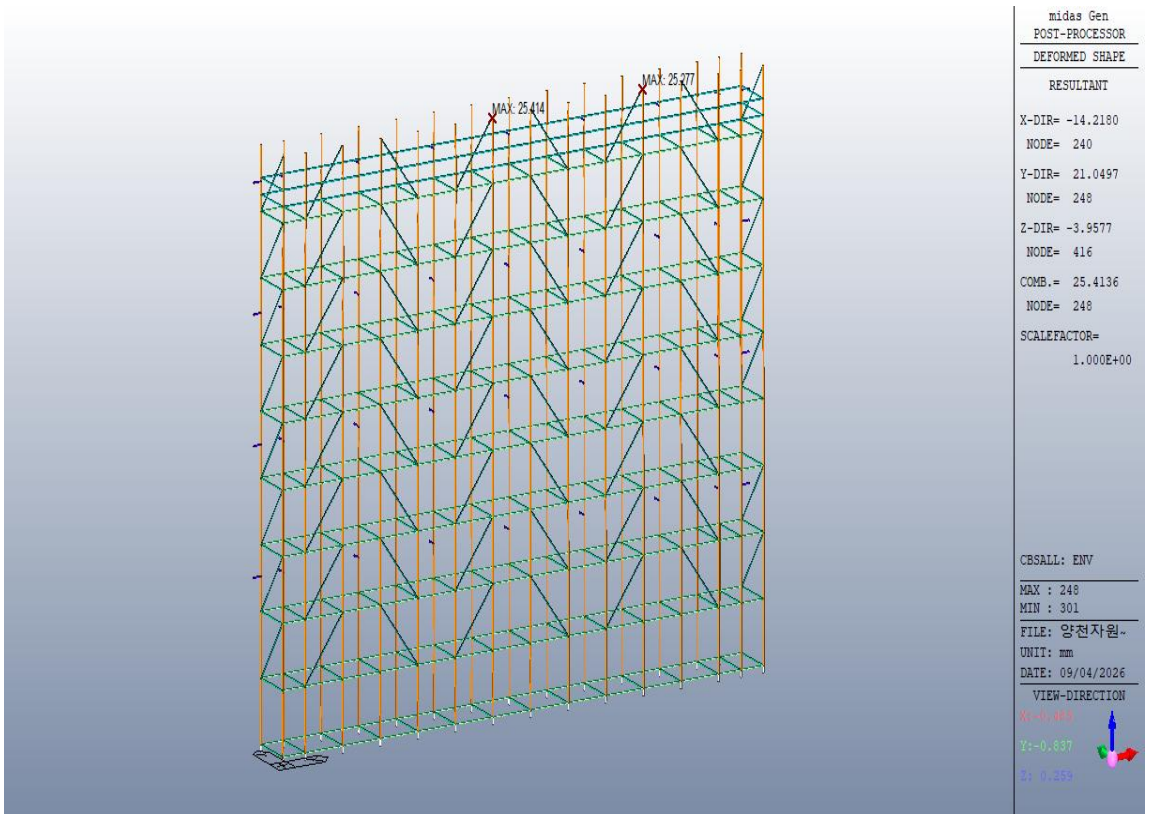
4. Checking Results

Slenderness Ratio
KL/r = 18.3 < 200.0 (Memb:942, LCB: 2)..... O.K
Axial Stress
fa/Fa = 0.00426/0.15791 = 0.027 < 1.000 ..... O.K
Bending Stresses
fby/Fby = 0.00034/0.18150 = 0.002 < 1.000 ..... O.K
fbz/Fbz = 0.00000/0.16500 = 0.000 < 1.000 ..... O.K
Combined Stress (Compression+Bending)
Rmax = fa/Fa + SQRT[(fbcy/Fbcy)^2 + (fbcz/Fbcz)^2] = 0.029 < 1.000 ..... O.K
Shear Stresses
fv/Fv = 0.000 < 1.000 ..... O.K

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4.2. 부재사용성 검토(Service Ability Check)



1) 처짐 확인

X-DIR	=	14.218	mm	L	/	270	=	64.074	mm	O.K
Y-DIR	=	21.050	mm	L	/	270	=	64.074	mm	O.K
Z-DIR	=	3.958	mm	L	/	270	=	64.074	mm	O.K