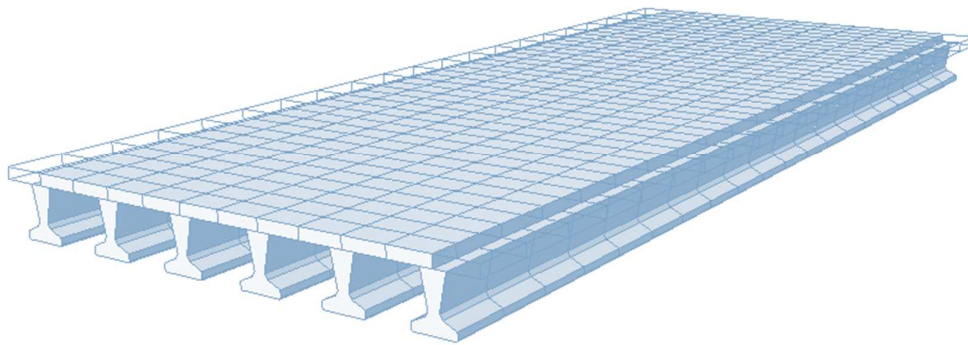


midas Civil

Basic Training Session

Training Session 4

Detailed Review in Analysis Results



midas **Civil**

Contents

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2. Creating load combinations
 - a. *Example 1 – Creating load combinations*
 - b. *Example 2 – Auto generation of load combinations for BS5400*
3. Checking results
 - a. *Example 1 – Checking member forces with diagrams*
 - b. *Example 2 – Saving images of the result*
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 - a. *Example 1 – Generating the dynamic report*
 - b. *Example 2 – Usage of Dynamic Report Auto Regeneration*

4. Detailed Review in Analysis Results

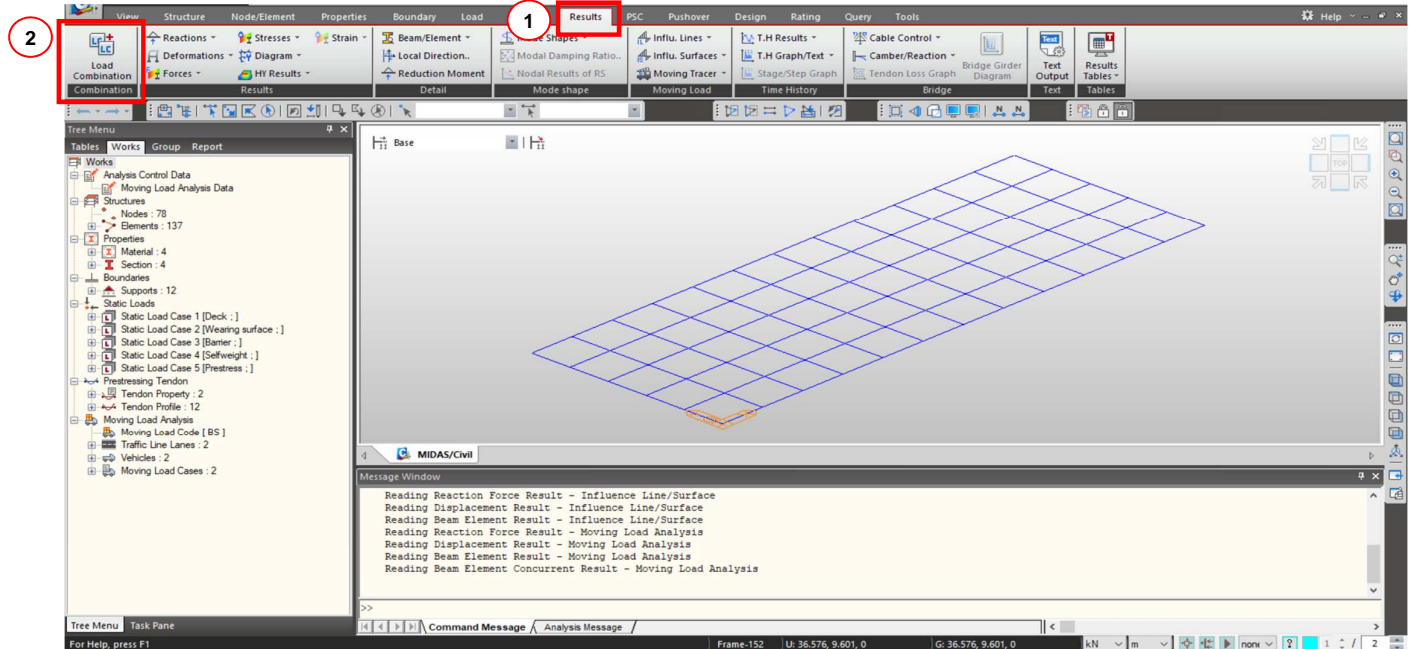
1. Objective

- a. Learning how to create load combinations.

2. Creating load combinations

1) General method

- a. Move to "Load Combination" (Results > Load Combination).



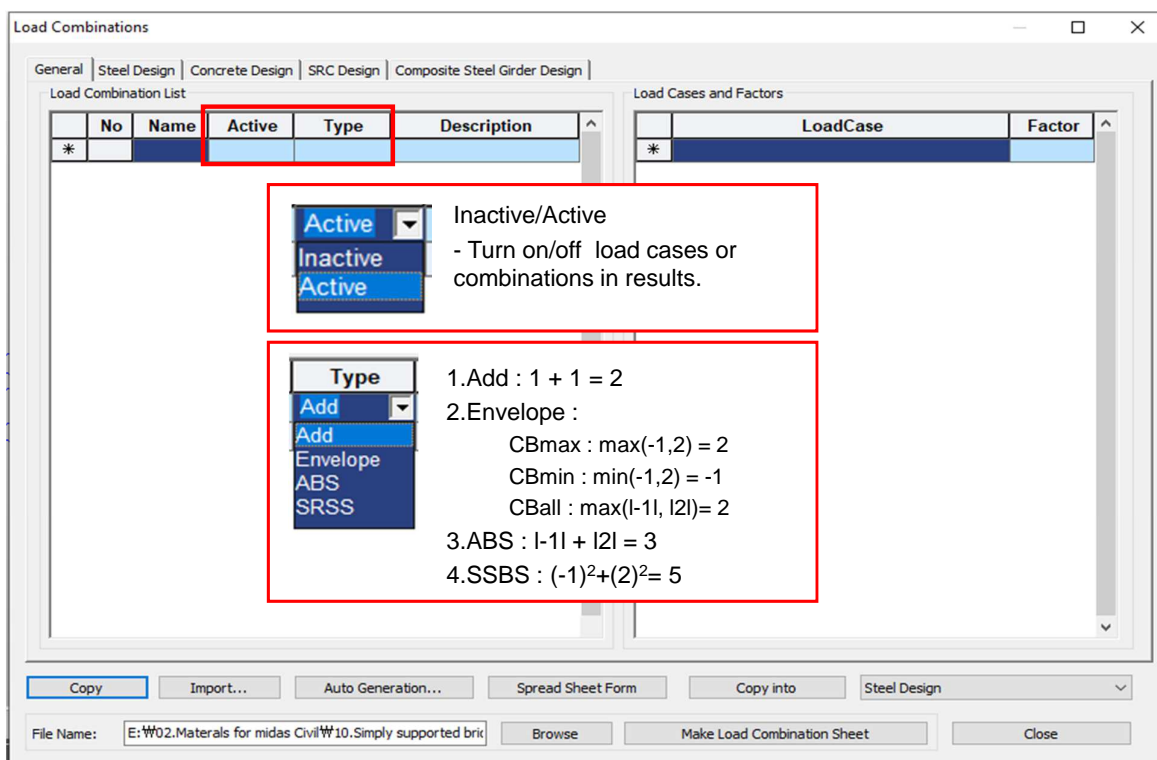
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4. Detailed Review in Analysis Results

2. Creating load combinations

b. Load Combinations



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4. Detailed Review in Analysis Results

Example 1 – Creating load combinations

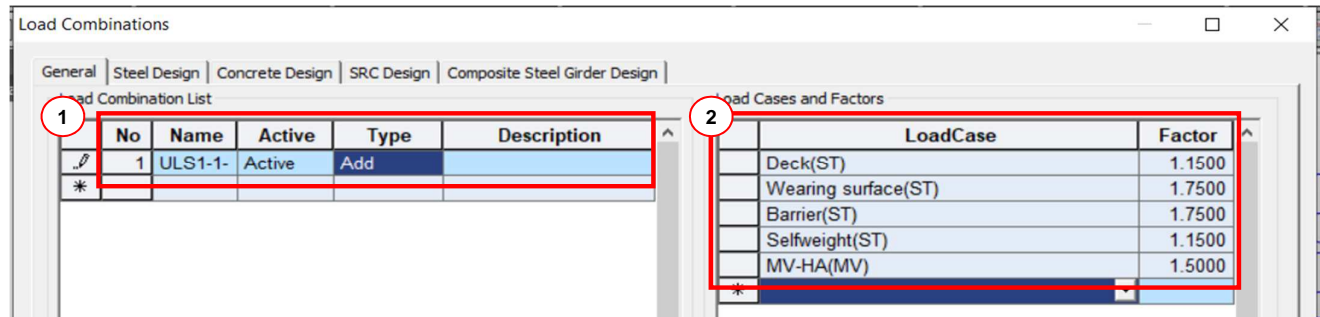
1) Sample for load combinations

Load combination example					
	Dead Load	Superimposed Dead	Earth pressure fill or surcharge	Moving load HA alone	Moving load HA&HB, HB alone
ULS1-1-Concrete	1.15	1.75	1.5	1.5	0
ULS1-1-Steel	1.05	1.75	1.5	1.5	0

2) Open “Load comb_EX1_start”.mcb

3) Move onto “Load Combination” in Results.

4) Make a load combination for ULS1-1-Concrete.



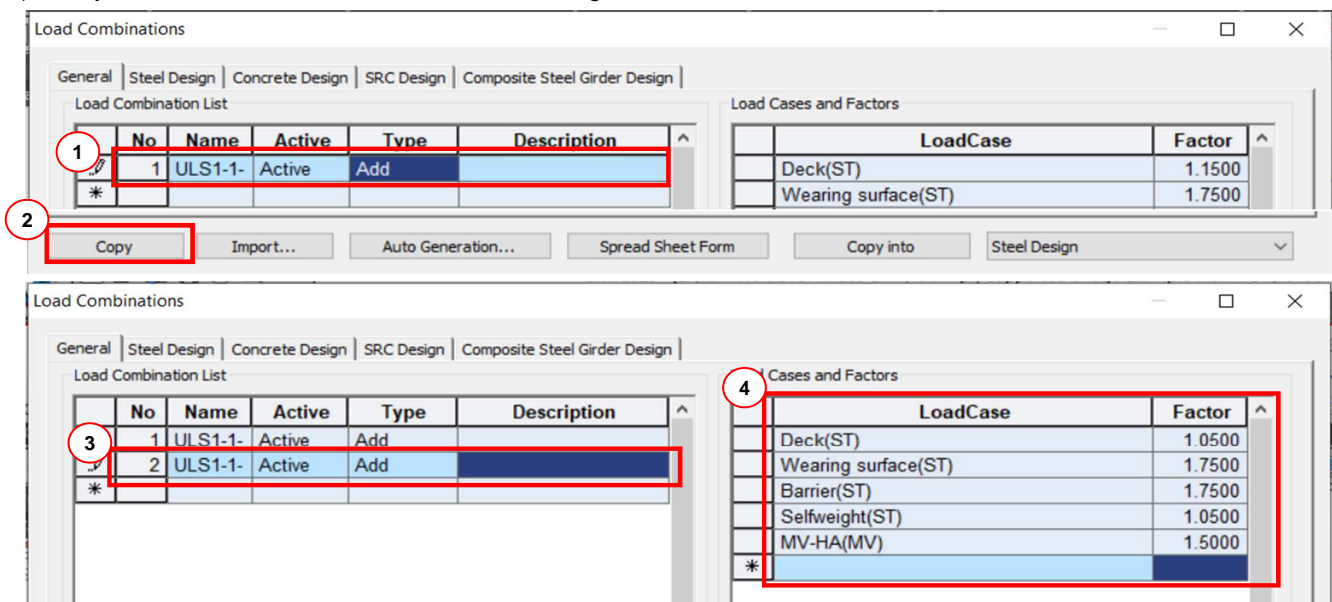
4. Detailed Review in Analysis Results

Example 1 – Creating load combinations

Load combination example					
	Dead Load	Superimposed Dead	Earth pressure fill or surcharge	Moving load HA alone	Moving load HA&HB, HB alone
ULS1-1-Concrete	1.15	1.75	1.5	1.5	0
ULS1-1-Steel	1.05	1.75	1.5	1.5	0

5) Click “ULS1-1Concrete” and click “Copy”.

6) Modify the name and the factor of “Deck” & “Selfweight” as 1.05.



4. Detailed Review in Analysis Results

Example 2 – Auto generation of load combinations for BS5400

- 1) midasCivil 2020 starts to generate load combinations for BS5400.
- 2) The rule for load combinations is following BD37/01, Part 14, Section 3, Volume 1

Table 1. Loads to be taken in each combination with appropriate γ_L

Class number	Load	Limit state	γ_L to be considered in combination				
			1	2	3	4	5
5.1	Dead: steel	ULS*	1.05	1.05	1.05	1.05	1.05
		SLS	1.00	1.00	1.00	1.00	1.00
	concrete	ULS*	1.15	1.15	1.15	1.15	1.15
		SLS	1.00	1.00	1.00	1.00	1.00
5.2	Superimposed dead: deck surfacing	ULS*	1.75	1.75	1.75	1.75	1.75
		SLS*	1.20	1.20	1.20	1.20	1.20
	other loads	ULS	1.20	1.20	1.20	1.20	1.20
		SLS	1.00	1.00	1.00	1.00	1.00
5.1.2.2 & 5.2.2.2	Reduced load factor for dead and superimposed dead load where this has a more severe total effect	ULS	1.00	1.00	1.00	1.00	1.00
5.3	Wind: during erection	ULS	1.10				
		SLS	1.00				
		ULS	1.40				
		SLS	1.10				
		SLS	1.00				
5.4	Temperature: restraint to movement, except frictional	ULS			1.30		
		SLS			1.00		
		ULS				1.30	
	frictional bearing restraint	ULS					1.30
		SLS					1.00
		ULS			1.00		
5.6	Differential settlement	ULS	1.20	1.20	1.20	1.20	1.20
		SLS	1.00	1.00	1.00	1.00	1.00
		ULS	1.20	1.20	1.20	1.20	1.20
5.7	Exceptional loads		to be assessed and agreed between the engineer & the appropriate authority				
5.8	Earth pressure: retained fill and/or live load	ULS	1.20	1.20	1.20	1.20	1.20
		SLS	1.00	1.00	1.00	1.00	1.00
		ULS	1.50	1.50	1.50	1.50	1.50
	non-vertical loads	ULS	1.50	1.50	1.50	1.50	1.50
		SLS	1.00	1.00	1.00	1.00	1.00
		ULS	1.00	1.00	1.00	1.00	1.00
5.9	Erection: temporary loads	ULS	1.15	1.15	1.15		
		SLS	1.00	1.00	1.00		
		ULS	1.50	1.25	1.25		
6.2	Highway bridges live loading: HA alone	ULS	1.50	1.25	1.25		
		SLS	1.20	1.00	1.00		
		ULS	1.30	1.10	1.10		
6.3	HA with HB or HB alone	ULS	1.30	1.10	1.10		
		SLS	1.10	1.00	1.00		
		ULS	1.50	1.25	1.25		
6.5	footway and cycle track loading	ULS	1.50	1.25	1.25		
		SLS	1.00	1.00	1.00		
		ULS	1.50	1.25	1.25		
6.6	accidental wheel loading**	ULS	1.50				
		SLS	1.20				

* γ_L shall be increased to at least 1.10 and 1.20 for steel and concrete respectively to compensate for inaccuracies when dead loads are not accurately assessed.

** γ_L may be reduced to 1.2 and 1.0 for the ULS and SLS respectively subject to approval of the appropriate authority (see 5.2.2.1).

**Accidental wheel loading shall not be considered as acting with any other primary live loads.

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Table 1 (continued)

Class number	Load	Limit state	γ_L to be considered in combination				
			1	2	3	4	5
6.7.1	Loads due to vehicle collision with parapets & associated primary live load:	Local effects: parapet load low & normal containment	ULS				1.50
		high containment	ULS				1.20
6.7.2	Global effects: parapet load	associated primary live load: low, normal & high containment	ULS				1.50
		Massive structures: bridge superstructures and non-elastomeric bearings	ULS				1.10
	Light structures: bridge superstructures & non-elastomeric bearings	bridge substructures and wing & retaining walls	ULS				1.25
		elastomeric bearings	ULS				1.00
	Massive & light structures: bridge superstructures, non-elastomeric bearings, bridge substructures & wing & retaining walls	elastomeric bearings	ULS				1.40
		associated primary live load: bridge superstructures, non-elastomeric bearings, bridge substructures & wing & retaining walls	ULS				1.40
6.8	Vehicle collision loads on bridge supports and superstructures:	Effects on all elements excepting elastomeric bearings	ULS				1.50
		Effects on elastomeric bearings	ULS				1.00
6.9	Centrifugal load & associated primary live load		ULS				1.50
6.10	Longitudinal load:	HA & associated primary live load	ULS				1.25
		HB associated primary live load	ULS				1.00
6.11	Accidental skidding load and associated primary live load		ULS				1.25
			ULS				1.00
7	Foot/cycle track bridges:	live load & effects due to parapet load	ULS	1.50	1.25	1.25	
		vehicle collision loads on supports and superstructures***	ULS	1.00	1.00	1.00	
8	Railway bridges:	type EU and RL and SW/O primary and secondary live loading	ULS	1.40	1.20	1.20	
			ULS	1.10	1.00	1.00	

***This is the only secondary live load to be considered for foot/cycle track bridges.

NOTE: For loads arising from creep and shrinkage, or from welding and lack of fit, see Parts 3, 4 and 5 of this standard, as appropriate.

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4. Detailed Review in Analysis Results

Example 2 – Auto generation of load combinations for BS5400

Table. The matching rules of load cases between BS & midasCivil

The load matched in BS	Load cases in midasCivil	Notes
5.1 Dead : concrete / steel(needed to modify)	Dead Load (D)	In Static Loads
5.2 Superimposed dead : deck surfacing	Dead Load of Wearing Surface (DW)	
5.2 Superimposed dead : other loads	Dead Load of Component and Attachments (DC)	
5.3 Wind	Wind Load on Structure (W)	
5.4 Temperature : restraint to movement, except frictional	Temperature (T)	
5.4 Temperature : effect of temperature difference	Temperature Gradient (TPG)	
5.4 Temperature : frictional bearing restraint	Friction (FR)	
5.6 Differential settlement	Settlement (SM)	In Settlement/Misc.
5.8 Earth pressure : retained fill and/or live load : vertical loads	Vertical Earth Pressure (EV)	In Static Loads
5.8 Earth pressure : retained fill and/or live load : non-vertical loads	Horizontal Earth Pressure (EH)	
6.2 ~ 6.5 Highway bridges live loading	Moving load cases (M)	In Moving Load
7. Foot/cycle track bridges		
6.7.1 & 6.8 for Collision	Collision Load (CO)	In Static Loads
6.9 Centrifugal load & associated primary live load	Centrifugal (CF)	
6.10 Longitudinal load	Braking Load (BRK)	

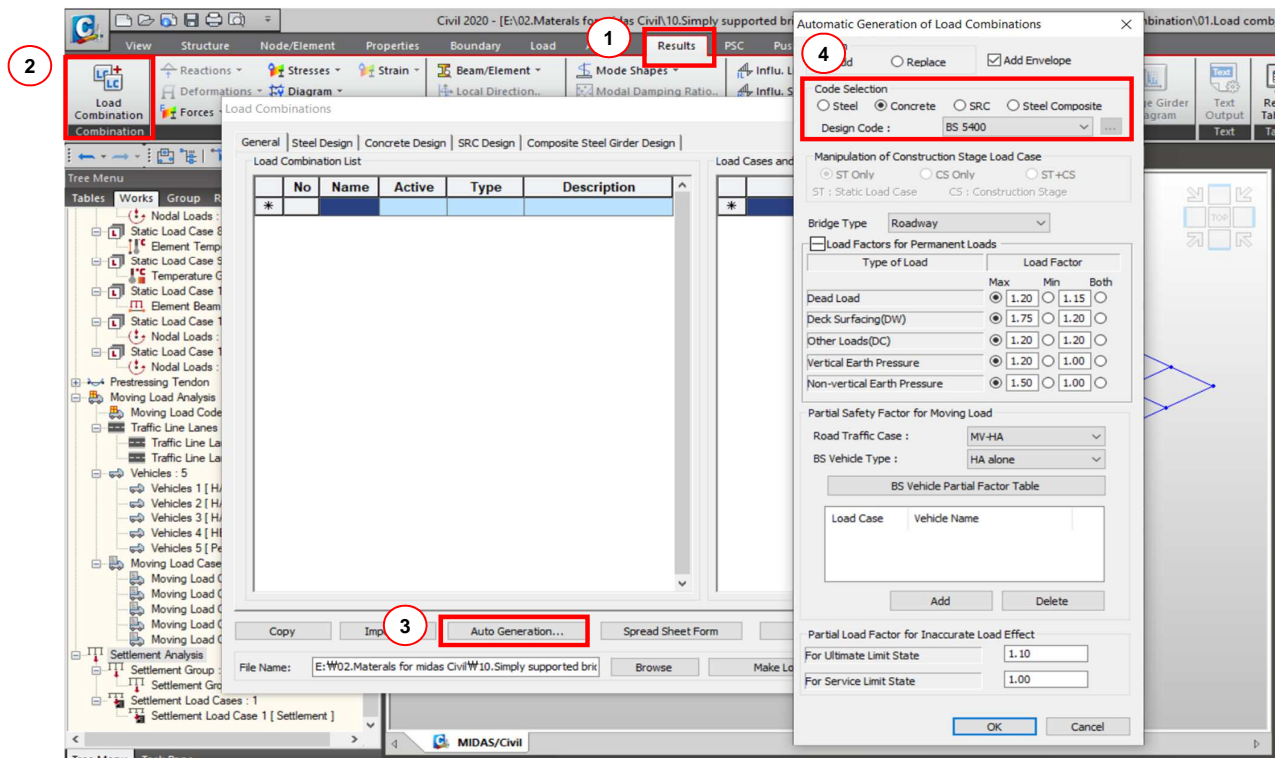
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4. Detailed Review in Analysis Results

Example 2 – Auto generation of load combinations for BS5400

- 1) Open "02.Load comb_EX2_Auto generation.mcb".
- 2) Move to "Load Combination".
- 3) Click "Auto Generation..." and select "Concrete" and "BS 5400".



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4. Detailed Review in Analysis Results

Example 2 – Auto generation of load combinations for BS5400

- 4) Select "Roadway" in Bridge Type
- 5) Match partial safety factor and moving load cases and click "Add".
 - MV-HA : HA alone
 - MV-HB : HB alone
 - MV-HA&HB : HA with HB
 - MV-HA&HB(Auto) : Auto
 - MV-Pedestrian : Footway/Cycle
- 6) Input values at "Partial Load Factor for Inaccurate Load Effect".
 - For Ultimate Limit State : 1.00
 - For Service Limit State : 1.00
- 7) Click "OK".

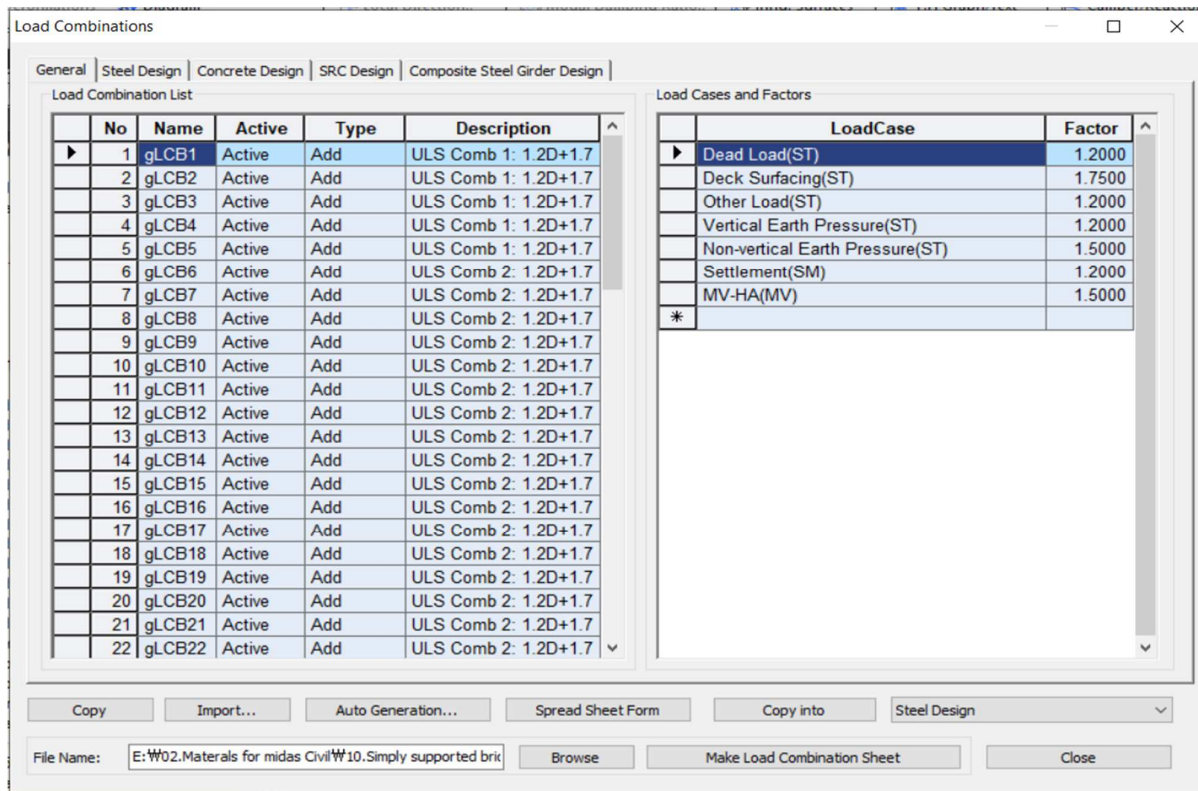
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4. Detailed Review in Analysis Results

Example 2 – Auto generation of load combinations for BS5400

8) Check load combinations along with descriptions.



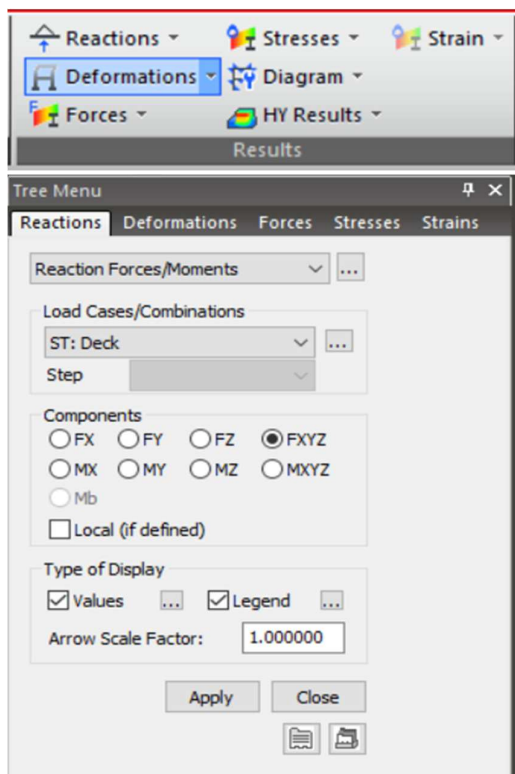
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4. Detailed Review in Analysis Results

3. Checking results

a. Basic components



Components for checking results

- Reactions
- Deformations
- Forces
- Stresses
- Others..



is for checking results data in a table.

Load cases / Combinations for checking



is for generating load combinations.

Results for 6 or 7 DOF

Display options



is for setting detail options of Values & Legend.

Screenshot feature for saving images

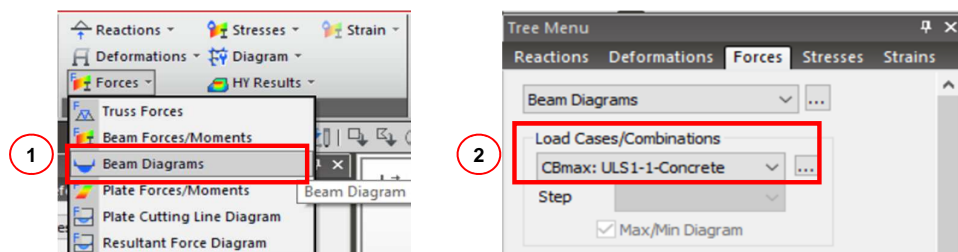
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4. Detailed Review in Analysis Results

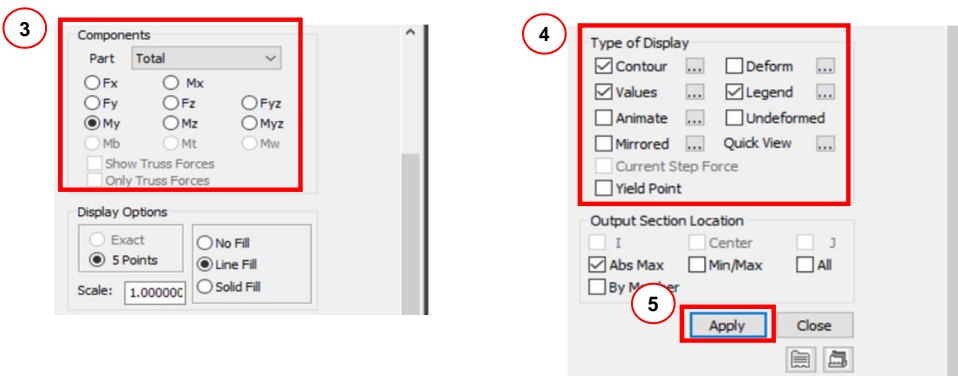
Example 1 – Checking member forces with diagrams

1) Click “Beam Diagrams” and select “CBmax: ULS1-1Concrete”.



3) Select “My” in components to check the bending moment.

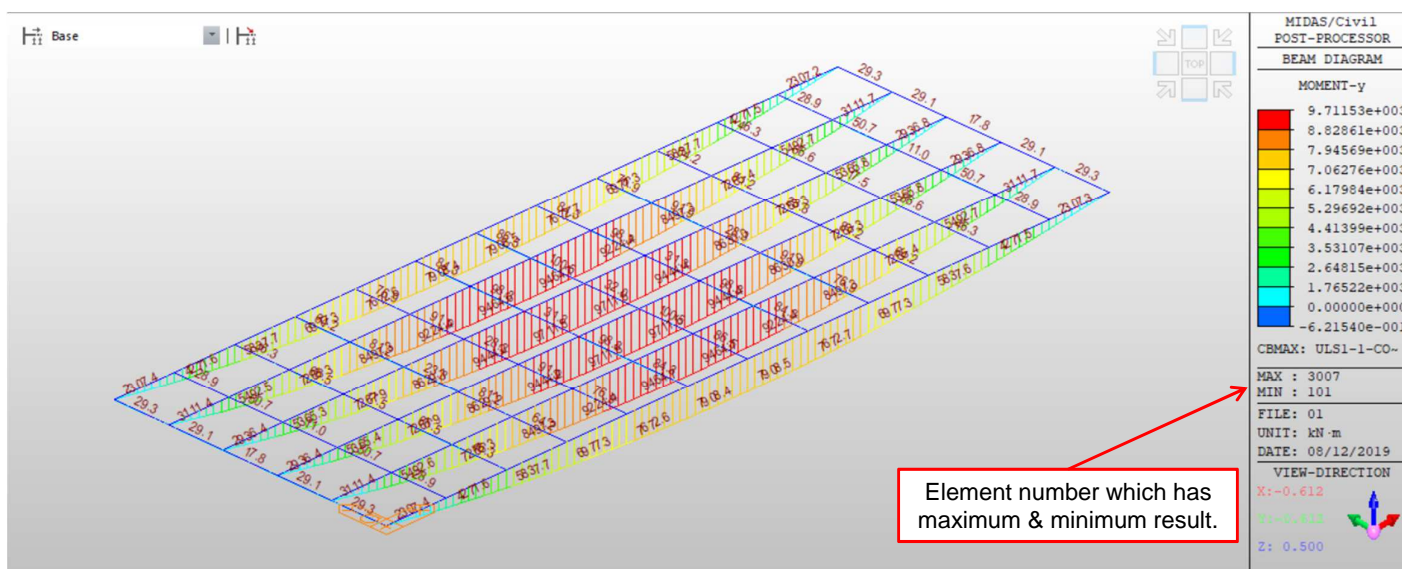
4) Check on “Contour”, “Legend” and “Values” and click Apply.



4. Detailed Review in Analysis Results

Example 1 – Checking member forces with diagrams

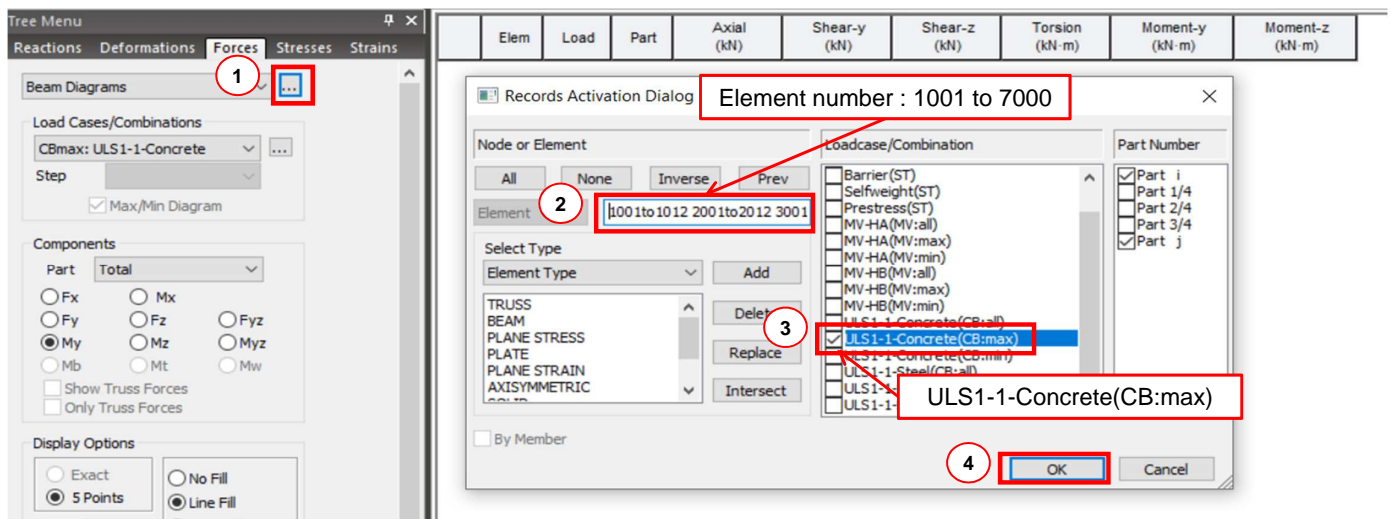
5) Result view



4. Detailed Review in Analysis Results

Example 1 – Checking member forces with diagrams

6) Checking with results in “Result Table”.



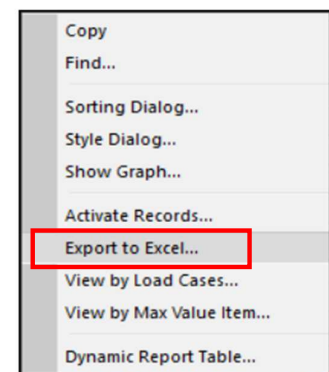
4. Detailed Review in Analysis Results

Example 1 – Checking member forces with diagrams

6) Checking with results in “Result Table”.

	Elem	Load	Part	Axial (kN)	Shear-y (kN)	Shear-z (kN)	Torsion (kN-m)	Moment-y (kN-m)	Moment-z (kN-m)
▶	1001	ULS1-1-Concrete(max)	J[1001]	0.75	1.06	-597.31	5.52	14.51	1.15
	1001	ULS1-1-Concrete(max)	J[1002]	0.75	1.06	-493.60	5.52	2307.37	9.80
	1002	ULS1-1-Concrete(max)	J[1002]	2.37	-0.22	-498.96	0.74	2324.70	-0.09
	1002	ULS1-1-Concrete(max)	J[1003]	2.37	-0.22	-395.25	0.74	4271.58	13.84
	1003	ULS1-1-Concrete(max)	J[1003]	5.63	-0.60	-398.33	-0.28	4286.07	0.00
	1003	ULS1-1-Concrete(max)	J[1004]	5.63	-0.60	-294.61	-0.28	5837.65	18.27
	1004	ULS1-1-Concrete(max)	J[1004]	9.07	-0.66	-298.46	3.31	5848.68	2.38
	1004	ULS1-1-Concrete(max)	J[1005]	9.07	-0.66	-194.75	3.31	6977.29	18.99
	1005	ULS1-1-Concrete(max)	J[1005]	11.54	1.00	-199.36	8.11	6984.61	5.50
	1005	ULS1-1-Concrete(max)	J[1006]	11.54	1.00	-95.65	8.11	7672.65	15.43
	1006	ULS1-1-Concrete(max)	J[1006]	12.56	3.52	-83.24	12.27	7675.81	8.78
	1006	ULS1-1-Concrete(max)	J[1007]	12.56	3.52	20.47	12.27	7908.44	12.88
	1007	ULS1-1-Concrete(max)	J[1007]	12.11	4.67	43.90	17.06	7908.45	10.24
	1007	ULS1-1-Concrete(max)	J[1008]	12.11	4.67	147.62	17.06	7675.82	12.05
	1008	ULS1-1-Concrete(max)	J[1008]	10.62	7.14	176.22	23.27	7672.68	13.72
	1008	ULS1-1-Concrete(max)	J[1009]	10.62	7.14	279.94	23.27	6984.64	9.75
	1009	ULS1-1-Concrete(max)	J[1009]	8.18	9.61	318.81	29.55	6977.31	17.66
	1009	ULS1-1-Concrete(max)	J[1010]	8.18	9.61	422.53	29.55	5848.72	6.99
	1010	ULS1-1-Concrete(max)	J[1010]	5.49	9.90	457.48	35.85	5837.65	16.70
	1010	ULS1-1-Concrete(max)	J[1011]	5.49	9.90	561.19	35.85	4286.10	5.50
	1011	ULS1-1-Concrete(max)	J[1011]	3.13	8.52	587.03	39.39	4271.52	13.10
	1011	ULS1-1-Concrete(max)	J[1012]	3.13	8.52	690.75	39.39	2324.68	4.62
	1012	ULS1-1-Concrete(max)	J[1012]	1.22	4.28	702.21	29.28	2307.26	9.01
	1012	ULS1-1-Concrete(max)	J[1013]	1.22	4.28	805.93	29.28	13.65	5.01
	2001	ULS1-1-Concrete(max)	J[2001]	43.45	2.35	-665.98	6.97	3.86	2.03
	2001	ULS1-1-Concrete(max)	J[2002]	43.45	2.35	-554.59	6.97	3111.38	11.75
	2002	ULS1-1-Concrete(max)	J[2002]	37.52	2.45	-498.69	4.09	3091.23	4.09
	2002	ULS1-1-Concrete(max)	J[2003]	37.52	2.45	-387.30	4.09	5492.57	12.34
	2003	ULS1-1-Concrete(max)	J[2003]	29.97	1.27	-334.12	3.13	5475.89	3.99

- All data can be copied and pasted into a spread sheet.
- In order to export data to Excel, right click and click “Export to Excel”.



4. Detailed Review in Analysis Results

Example 1 – Checking member forces with diagrams

7) Checking corresponding forces

- Right click and click “View by Max Value Item”.
- Select components and load cases or combinations.

Corresponding components

Elem	Load	Part	Component	Axial (kN)	Shear-y (kN)	Shear-z (kN)	Torsion (kN·m)	Moment-y (kN·m)	Moment-z (kN·m)
1001	ULS1-1-Conc	I[1001	Axial	0.75	0.43	-712.37	-6.00	2.69	-0.75
1001	ULS1-1-Conc	I[1001	Shear-y	-1.27	1.06	-628.48	5.51	1.28	1.15
1001	ULS1-1-Conc	I[1001	Shear-z	-34.85	-2.46	-597.31	-4.21	5.93	-3.02
1001	ULS1-1-Conc	I[1001	Torsion	-1.38	1.04	-628.37	5.52	1.27	1.13
1001	ULS1-1-Conc	I[1001	Moment-y	-41.77	-3.93	-778.09	-28.44	14.51	-7.53
1001	ULS1-1-Conc	I[1001	Moment-z	-1.31	1.06	-628.91	5.51	1.31	1.15

Major components

Max/Min results

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4. Detailed Review in Analysis Results

Example 2 – Saving images of the result

1) Move back to model view and click “Beam Diagram”.

2) Click “Save Dialog Information For Batch Output Generation”.

This feature saves an image with current result view.

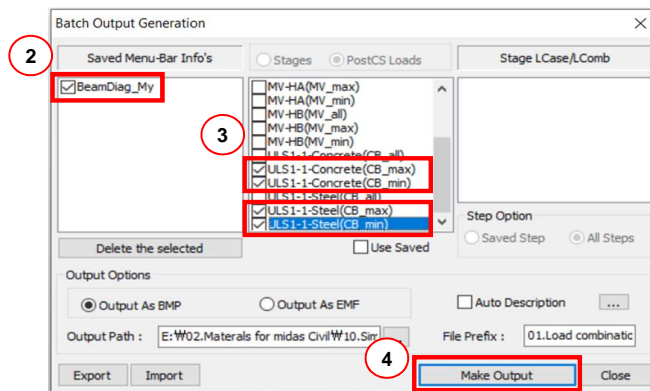
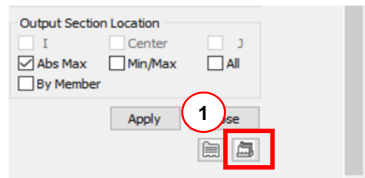
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4. Detailed Review in Analysis Results

Example 2 – Saving images of the result

- 3) Click "Batch Output Generation".
- 4) Select a view type and load cases or combinations.
- 5) Click "Make Output".
- 6) Result images will be saved in "Output Path".

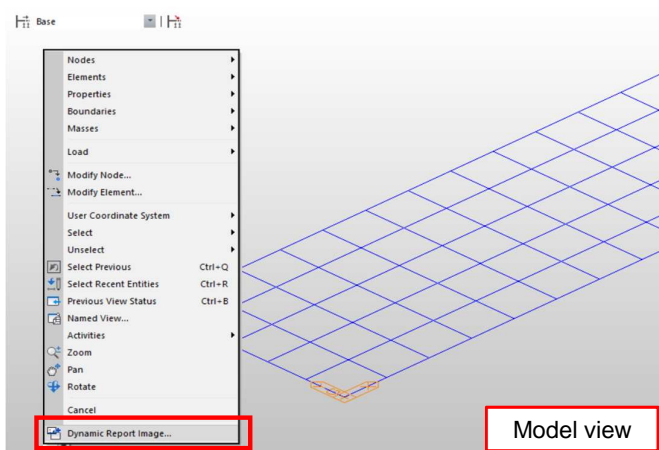
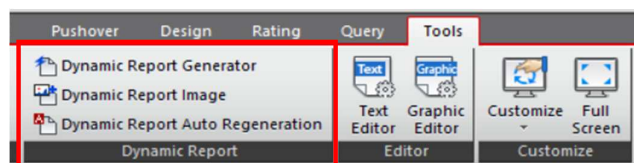


4. Detailed Review in Analysis Results

4. Dynamic report

- 1) This feature makes a document and users can put contents such as input data table, result tables and figures in the document.
- 2) Dynamic report which is created once can be updated along with changed data.

Key words : Dynamic Report Generator, Dynamic Report image, Dynamic Report table and Dynamic Report Auto Regeneration

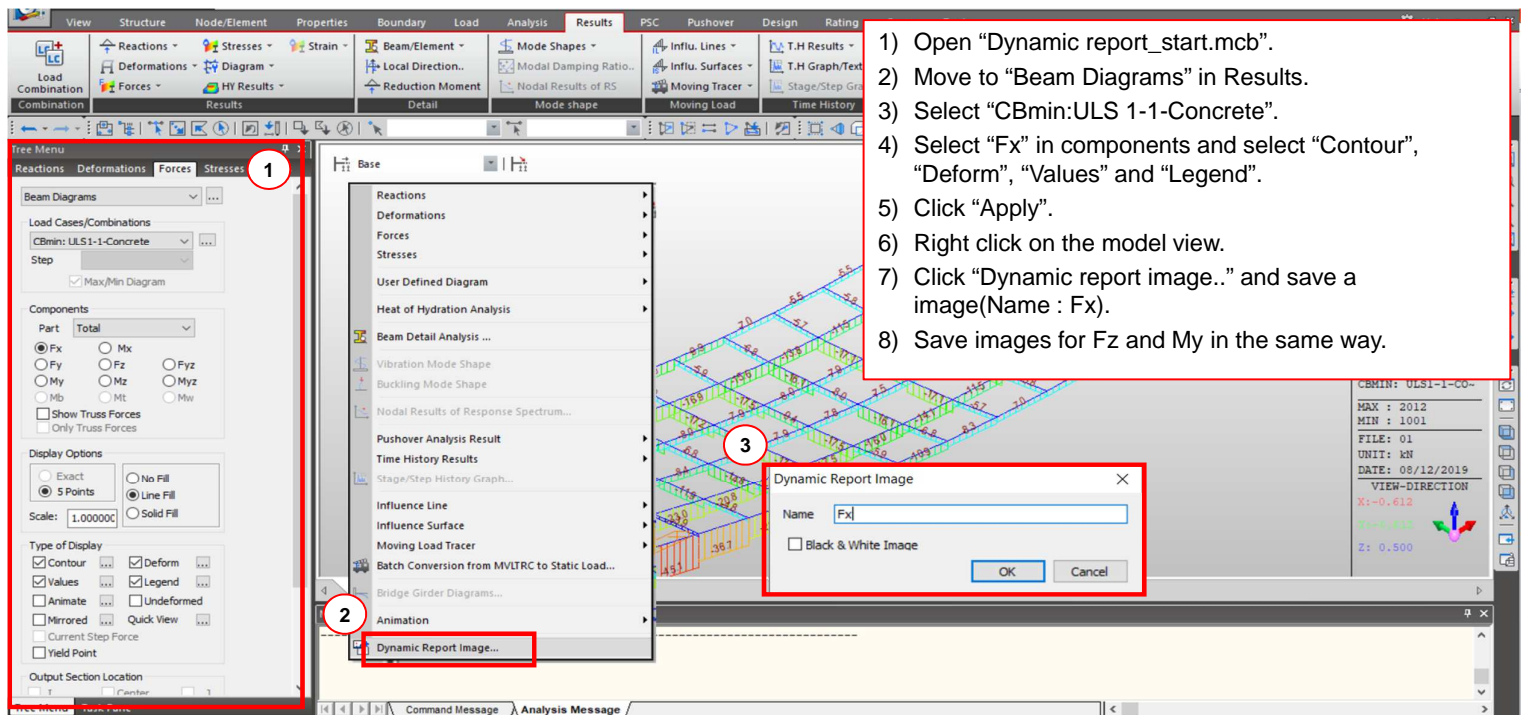


Elem	Load	Part	Axial (kN)	Shear-y (kN)	Shear-z (kN)	Torsion (kN m)	Moment-y (kN m)	Moment-z (kN m)
1001	Deck	[1001]	-3.87	-0.29	-211.92	-2.14	1.19	-0.56
1002	Deck	[1002]	-2.95	-0.74	-177.64	-2.87	596.98	-1.37
1003	Deck	[1003]	-1.85	-0.84	-142.49	-2.60	1087.98	-1.27
1004	Deck	[1004]	-0.75	-0.74	-106.92	-1.99	1471.45	-0.90
1005	Deck	[1005]	0.13	-0.48	-71.11	-1.24	1748.04	-0.37
1006	Deck	[1006]	0.66	-0.20	-35.16	-0.42	1910.97	0.09
1007	Deck	[1007]	0.88	-0.01	0.82	0.42	1965.81	0.38
1008	Deck	[1008]	0.81	0.24	36.77	1.24	1910.43	0.76
1009	Deck	[1009]	0.47	0.45	72.58	1.99	1744.99	0.96
1010	Deck	[1010]	0.05	0.47	108.15	2.60	1489.92	0.80
1011	Deck	[1011]	-0.20	0.29	143.30	2.87	1086.04	0.37
1012	Deck	[1012]	-0.09	-0.08	177.58	2.14	594.72	-0.15
2001	Deck	[2001]	1.09	-0.53	-240.52	-0.21	-0.56	-0.90
2002	Deck	[2002]	0.71	-0.98	-199.53	-0.59	689.00	-1.74
2003	Deck	[2003]	0.20	-1.02	-159.31	-2.23	1213.80	-1.52
2004	Deck	[2004]	-0.34	-0.88	-119.47	-1.68	1636.22	-1.07
2005	Deck	[2005]	-0.78	-0.59	-78.82	-1.94	1937.42	-0.46
2006	Deck	[2006]	-0.99	-0.28	-40.27	-0.35	2117.96	0.06
2007	Deck	[2007]	-1.01	-0.05	-0.74	0.35	2178.21	0.41
2008	Deck	[2008]	-0.83	0.23	38.81	1.04	2118.20	0.81
2009	Deck	[2009]	-0.49	0.45	78.45	1.68	1937.86	1.03
2010	Deck	[2010]	-0.10	0.49	118.30	2.23	1636.89	0.89
2011	Deck	[2011]	0.14	0.36	158.52	2.59	1214.68	0.53
2012	Deck	[2012]	0.10	0.03	199.50	2.21	670.05	0.08
3001	Deck	[3001]	2.57	-0.15	-245.75	-0.68	-0.63	-0.29
3002	Deck	[3002]	2.85	-0.28	-204.65	-0.81	684.79	-0.53
3003	Deck	[3003]	1.47	-0.32	-163.66	-0.73	1245.04	-0.49
3004	Deck	[3004]	0.93	-0.29	-122.71	-0.57	1680.54	-0.36
3005	Deck	[3005]	0.50	-0.21	-81.80	-0.36	1991.46	-0.17
3006	Deck	[3006]	0.20	-0.12	-40.93	-0.12	2177.99	0.07
3007	Deck	[3007]	0.82	-0.05	-0.06	0.12	2240.26	0.09
3008	Deck	[3008]	-0.06	0.03	40.79	0.36	2178.30	0.09
3009	Deck	[3009]	-0.05	0.09	81.69	0.57	1992.07	0.07

Data in a table

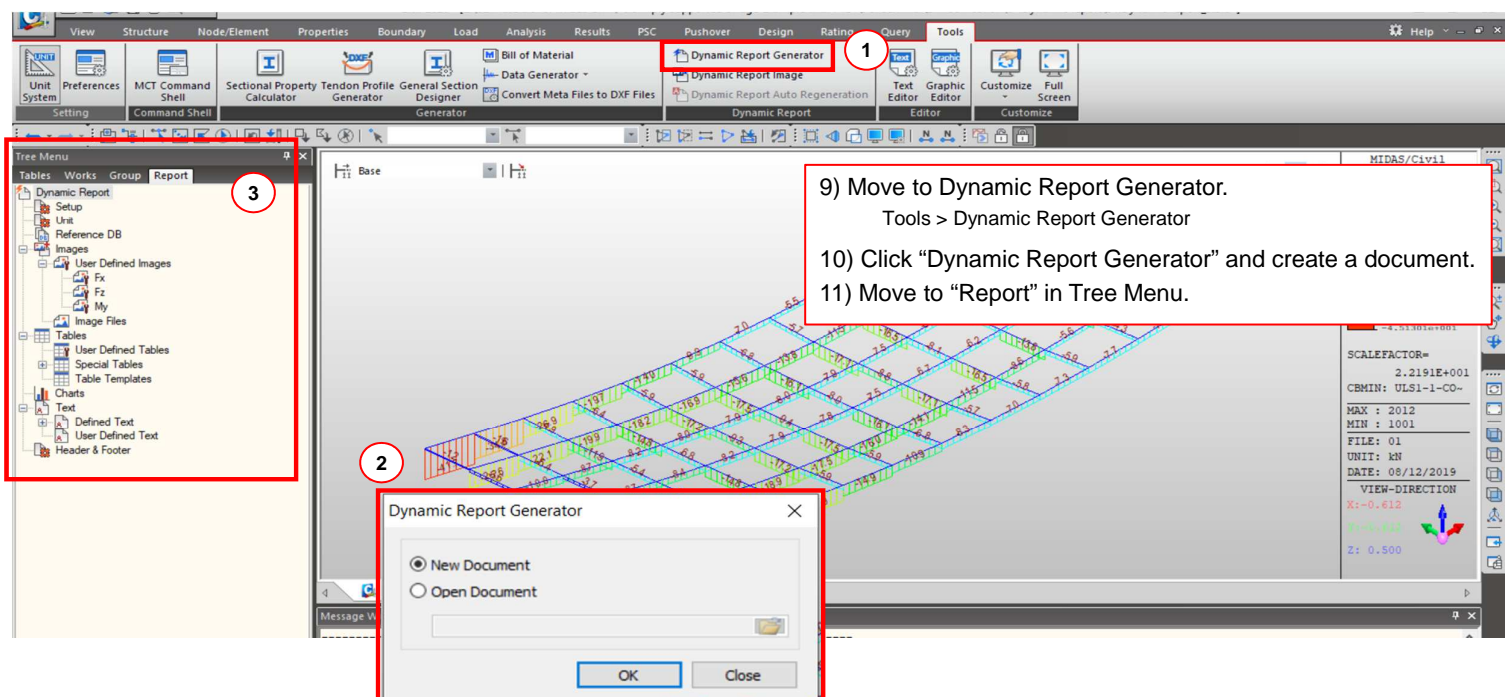
4. Detailed Review in Analysis Results

Example 1 – Generating the dynamic report



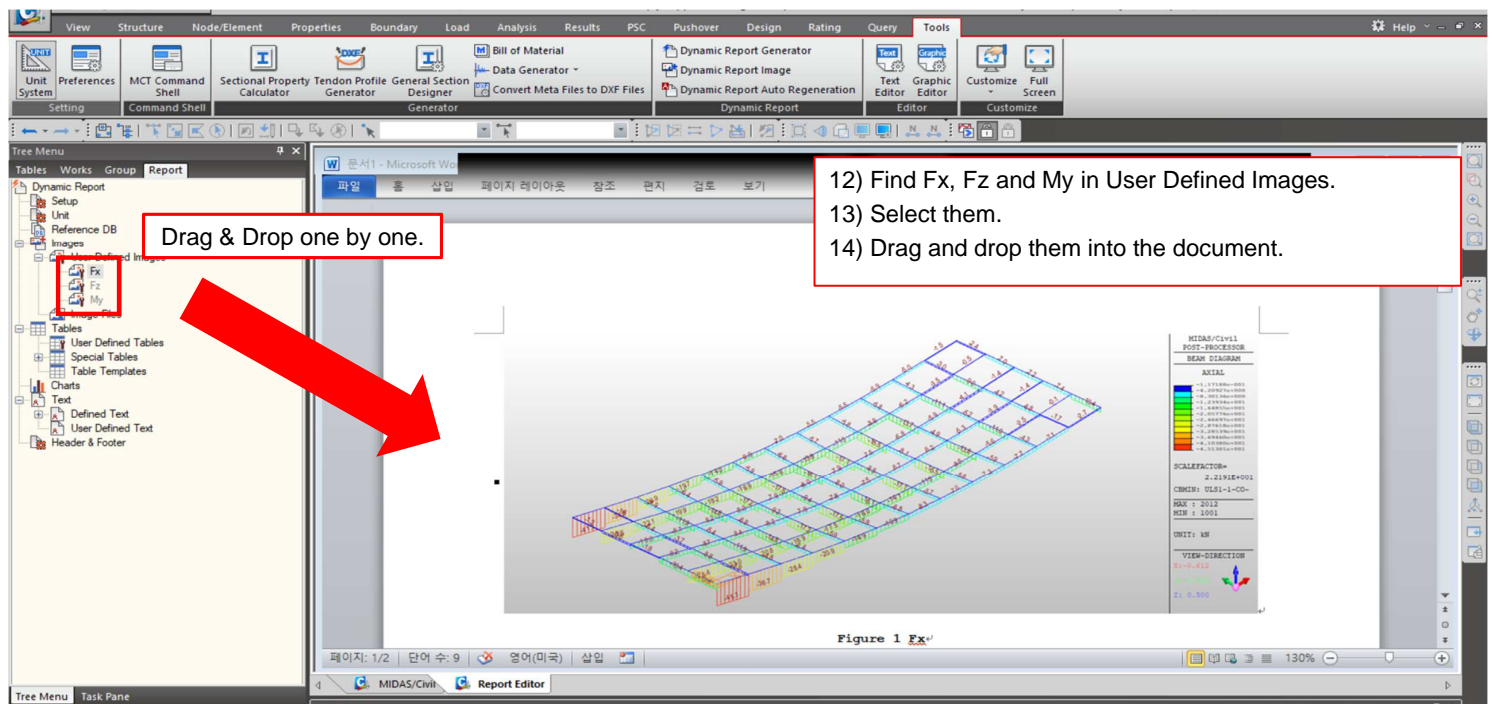
4. Detailed Review in Analysis Results

Example 1 – Generating the dynamic report



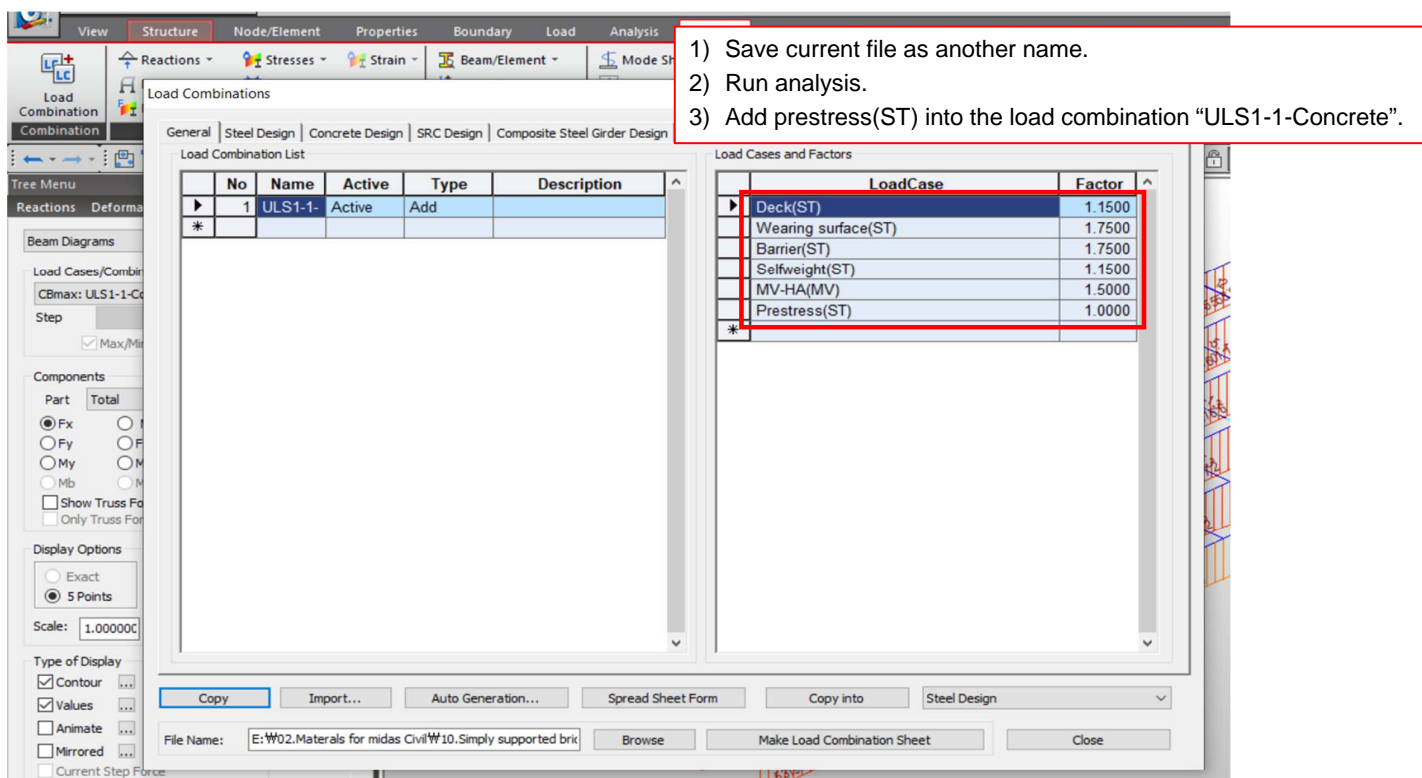
4. Detailed Review in Analysis Results

Example 1 – Generating the dynamic report



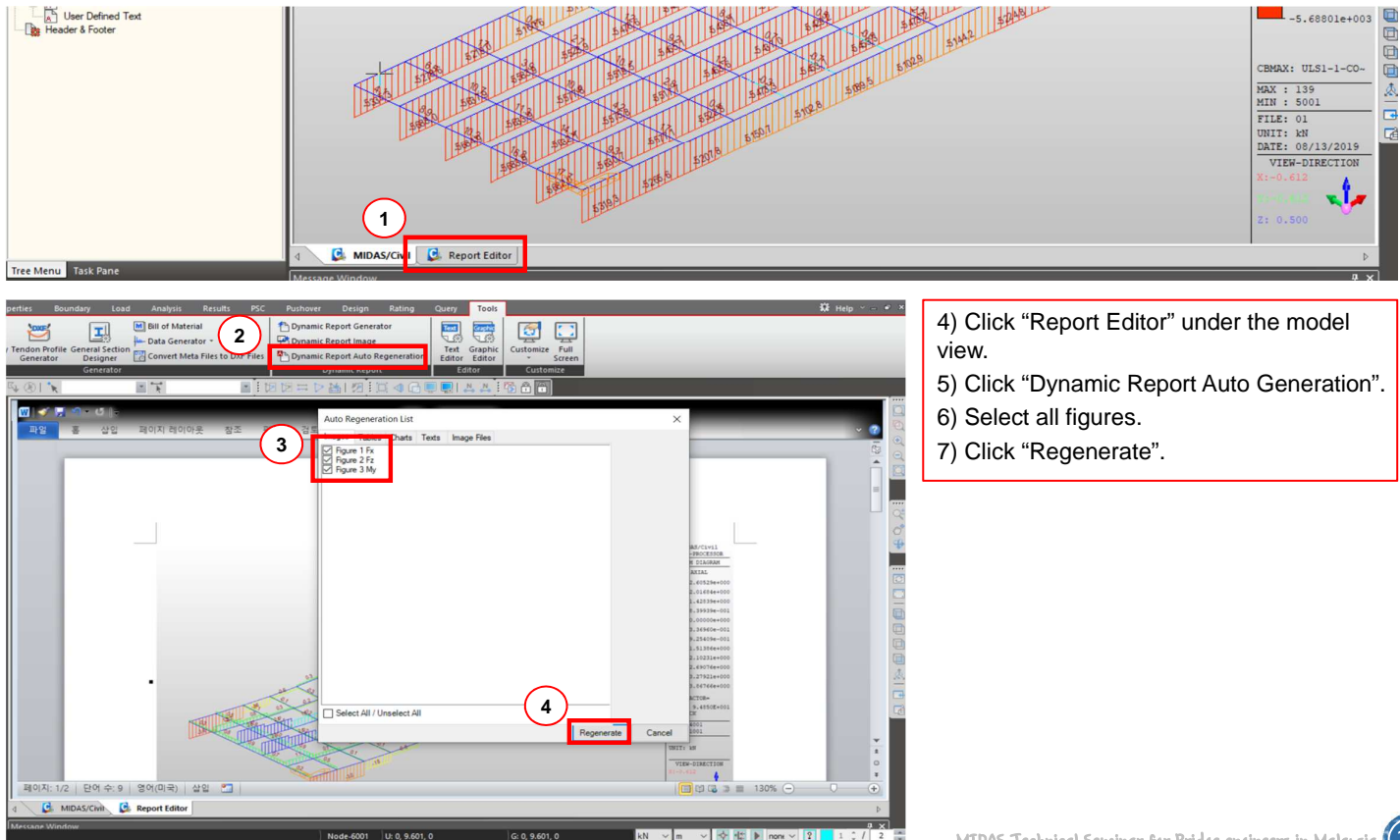
4. Detailed Review in Analysis Results

Example 2 – Usage of Dynamic Report Auto Regeneration



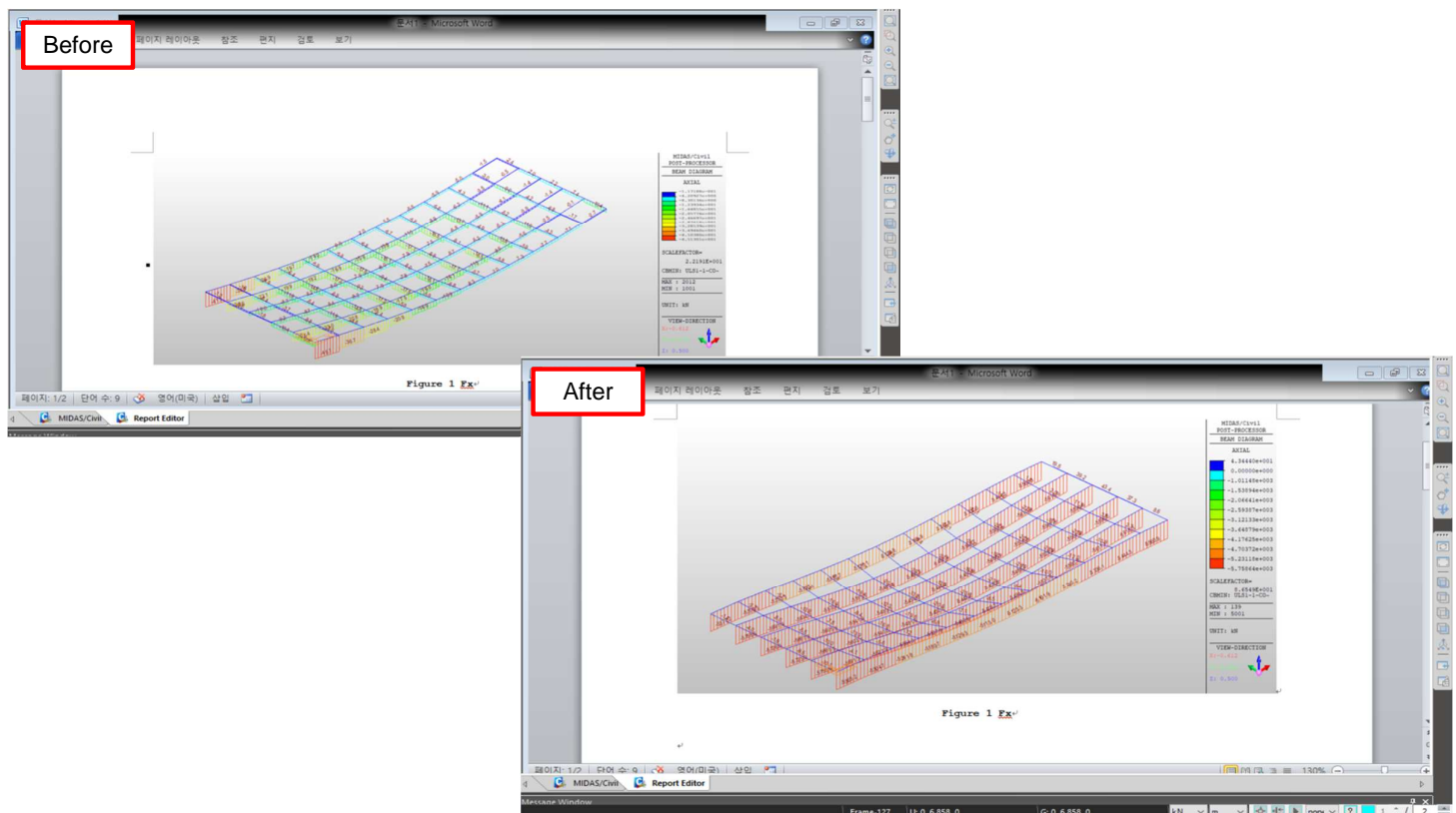
4. Detailed Review in Analysis Results

Example 2 – Usage of Dynamic Report Auto Regeneration



4. Detailed Review in Analysis Results

Example 2 – Usage of Dynamic Report Auto Regeneration



End