midas Design+

USER GUIDE

for Batch Beam & Column Design

Solution for Structural Member Design with Drawing & Report

MIDAS

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USER GUIDE

for Batch Beam& Column Design

midas Design+ *2024 (v1.1)*

Solution for Structural Member Design
with Drawing & Report

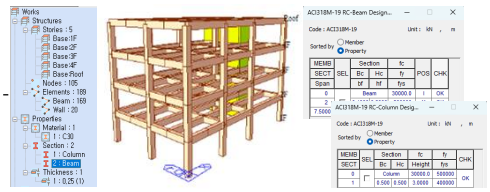
00. Introduction

• There are many inconveniences when performing design in Gen. For example, when a section needs to be added when grouping members or when the cross section needs to be increased according to design results, analysis and design should be performed again. Since these cases must be performed repeatedly, a lot of time and effort are required depending on the magnitude of the building.

• Batch Design is a design feature to provide convenience for these repetitive tasks in Gen, and the procedure is as follows.

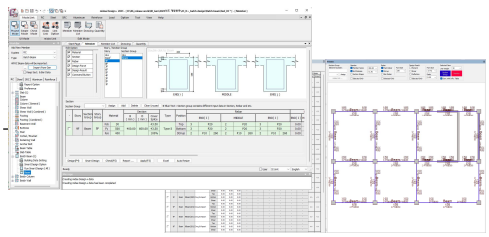
[Gen] Modeling & Analysis & Design

- *Create a model with simple section in Gen*
- *Perform an analysis*
- *Set a design condition and perform a design.*



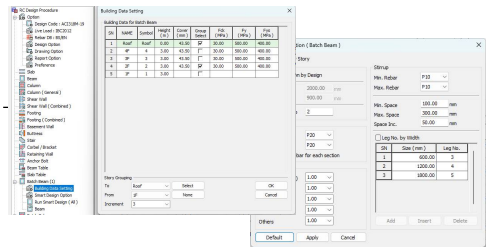
[Design+] Import Design Data of Gen

- *Section Name, Material, Section Size, Rebar.*
- *Design force.*
- *Design Setting (cover, design type).*
- *Design Condition (Seismic design).*



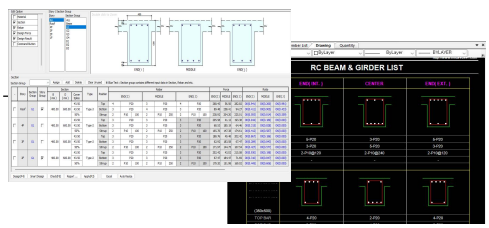
[Design+] Set Story & Design Options

- *Set Story Group*
- *Set Smart Design Option* ***(Not support EN, IS code)***



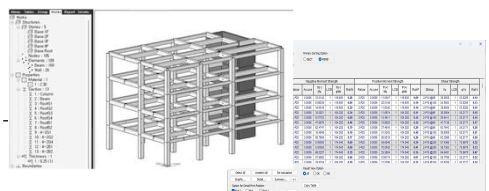
[Design+] Beam Grouping & Design & Drawing

- *Auto-design by "Smart Design".* ***(Not support EN, IS code)***
- *Do the grouping work for beam according to design force*
- *Auto-Design of member list drawing and quantity.*



[Gen] Export Design data to Gen

- *Create Sections by Group Name, Materials, Rebar information*
- *Run 'Code Check' in Gen*

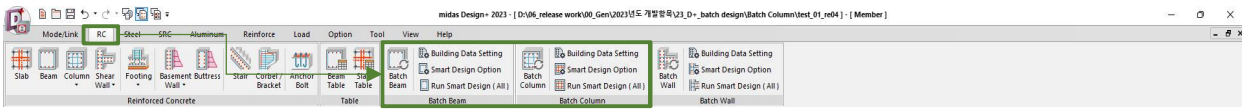


• The purpose of Batch Design is to quickly create and link the material, cross-section, and rebar information to Gen for analysis and design in Gen. Please use this product with the understanding that design results may differ slightly due to internal differences in design settings for Gen and Design+.

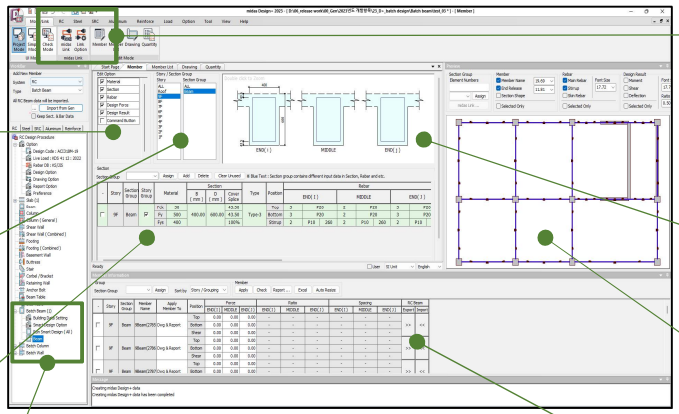
01 User Interface

Main UI

• UI layout and main functions for batch design are as follows.



Batch Design in main menu (RC > Batch Beam or Batch Column)



Edit Option

Control the items in section table.

Story/Section Group

Control how to display the section table.

Section Table

Display the design data, design force and design result by each group.

Batch Design Data

- Set the design conditions by story.
- Set the option for smart design. (EN and IS codes are not supported.)
- Display the group names.

midas Link

Link with midas Gen / All members are imported in batch design

View Section

Display the section shape and rebar arrangement.

Preview

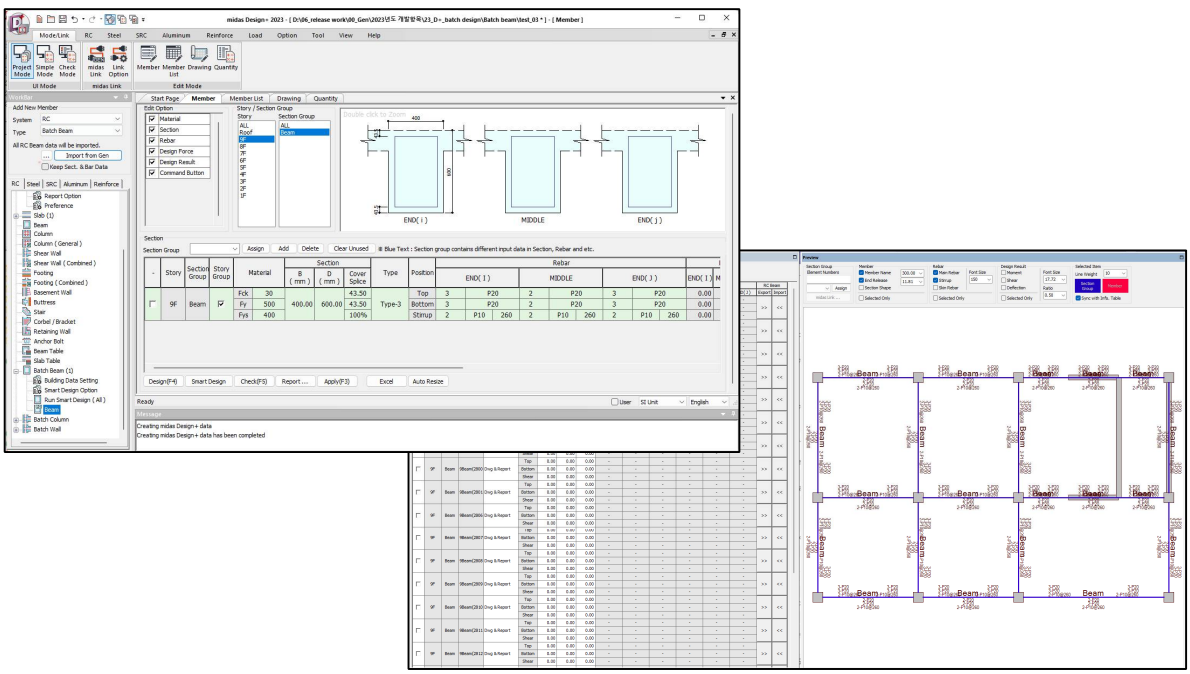
Provides the simple drawings and design information. Group's change is also supported.

Member Table

Display the design data, design force and design result by each group.

User Interface for batch design

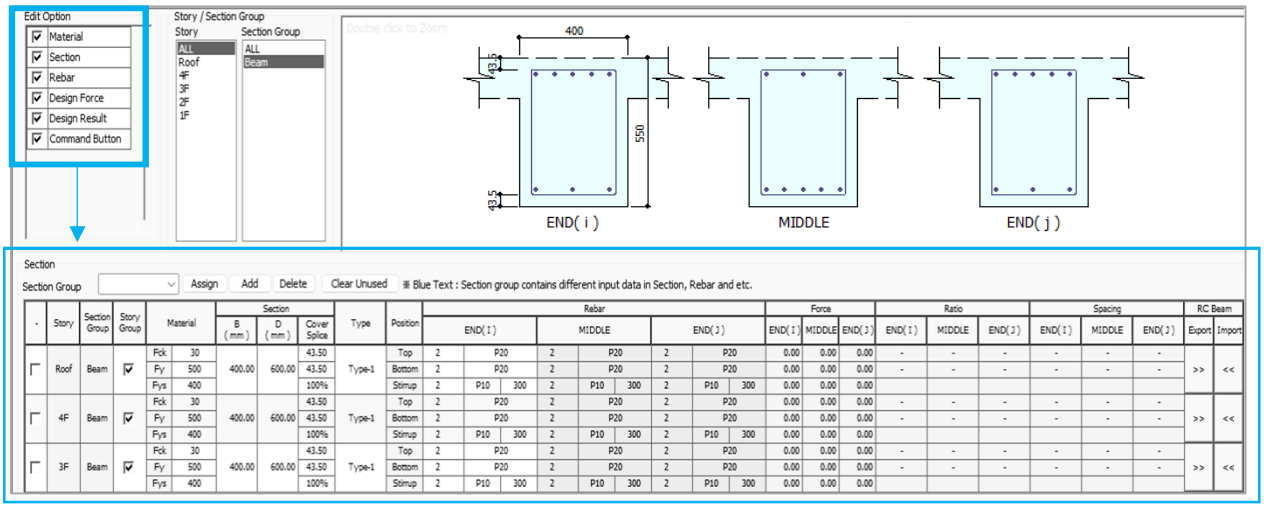
• If using a dual monitors, the member table and preview window can be placed separately.



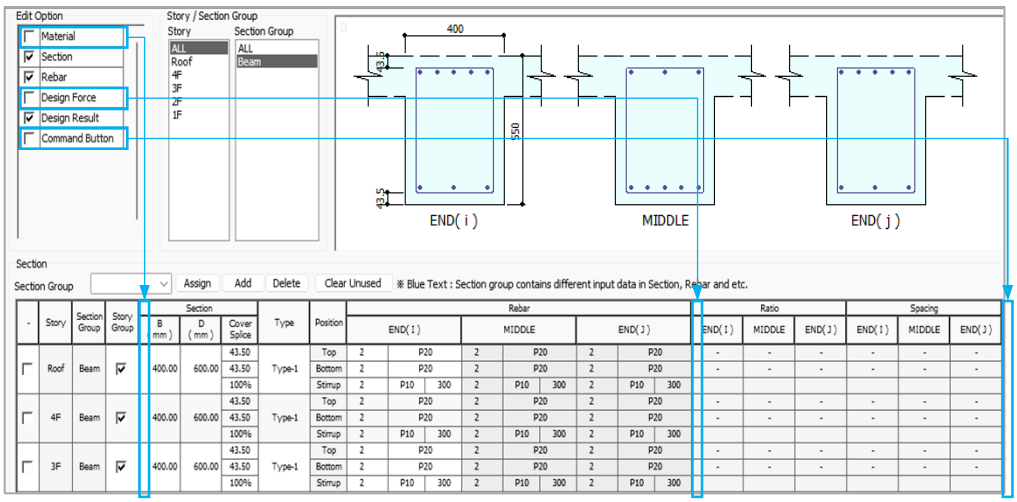
Example of window placement

Edit Option

• Control the display for each item. By checking only the items necessary for the purpose, table information can be simplified.



Section table when all items are checked

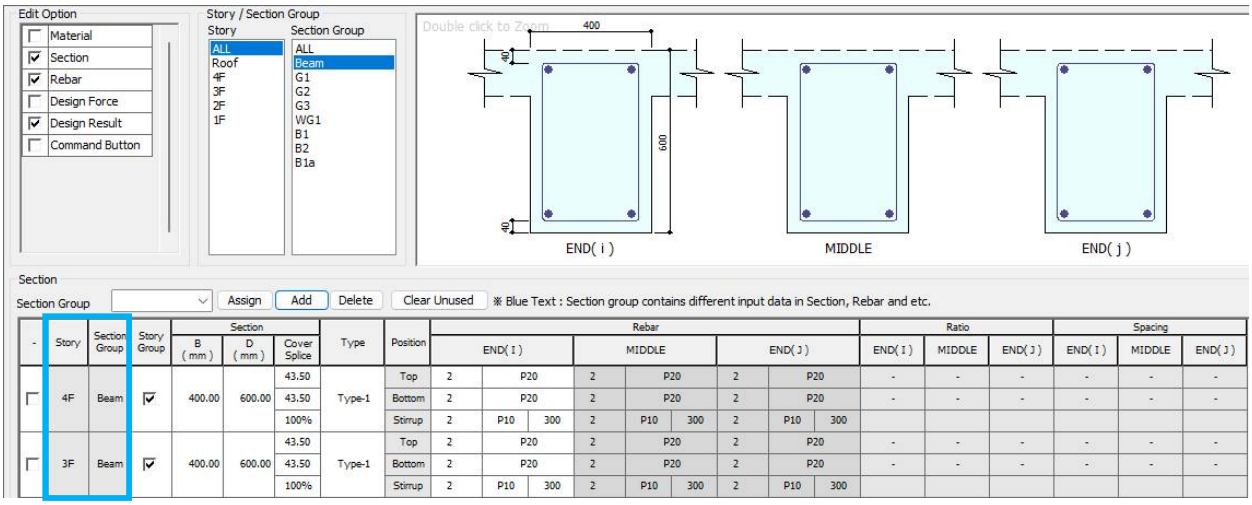


Section table when three items are not checked

Story/Section Group

- This feature is to control the list of section tables.
- The section tables is determined by a combination of story and section group
- Examples of combinations below:

When selecting Story "All" + Section Group "Beam"



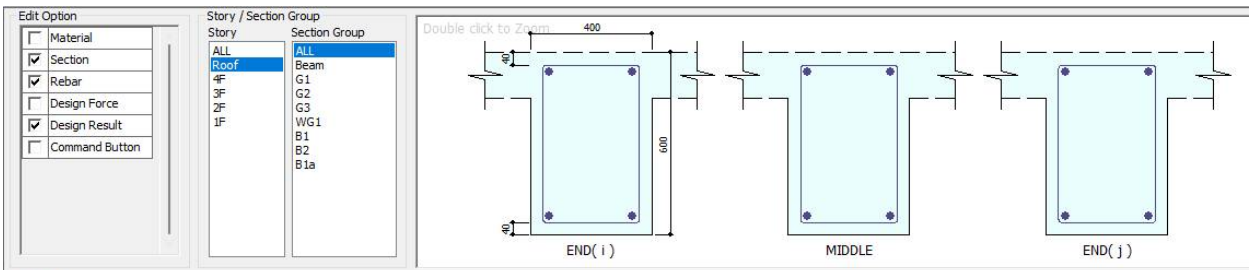
Section

Section Group | Assign | Add | Delete | Clear Unused | ※ Blue Text : Section group contains different input data in Section, Rebar and etc.

-	Story	Section Group	Story Group	Section B (mm)	Section D (mm)	Section Cover Splice	Type	Position	Rebar END(I)	Rebar MIDDLE	Rebar END(J)	Ratio END(I)	Ratio MIDDLE	Ratio END(J)	Spacing END(I)	Spacing MIDDLE	Spacing END(J)
☐	4F	Beam	☑	400.00	600.00	43.50	Type-1	Top	2 P20	2 P20	2 P20	-	-	-	-	-	-
						43.50		Bottom	2 P20	2 P20	2 P20	-	-	-	-	-	-
						100%		Stirrup	2 P10 300	2 P10 300	2 P10 300						
☐	3F	Beam	☑	400.00	600.00	43.50	Type-1	Top	2 P20	2 P20	2 P20	-	-	-	-	-	-
						43.50		Bottom	2 P20	2 P20	2 P20	-	-	-	-	-	-
						100%		Stirrup	2 P10 300	2 P10 300	2 P10 300						

→ "Beam" group for all stories are displayed.

When selecting Story "Roof" + Section Group "All"



Section

Section Group | Assign | Add | Delete | Clear Unused | ※ Blue Text : Section group contains different input data in Section, Rebar and etc.

-	Story	Section Group	Story Group	Section B (mm)	Section D (mm)	Section Cover Splice	Type	Position	Rebar END(I)	Rebar MIDDLE	Rebar END(J)	Ratio END(I)	Ratio MIDDLE	Ratio END(J)	Spacing END(I)	Spacing MIDDLE	Spacing END(J)
☐	Roof	G1	☑	400.00	600.00	43.50	Type-1	Top	2 P20	2 P20	2 P20	-	-	-	-	-	-
						43.50		Bottom	2 P20	2 P20	2 P20	-	-	-	-	-	-
						100%		Stirrup	2 P10 300	2 P10 300	2 P10 300						
☐	Roof	G2	☑	400.00	600.00	43.50	Type-1	Top	2 P20	2 P20	2 P20	-	-	-	-	-	-
						43.50		Bottom	2 P20	2 P20	2 P20	-	-	-	-	-	-
						100%		Stirrup	2 P10 300	2 P10 300	2 P10 300						
☐	Roof	WG1	☑	400.00	600.00	43.50	Type-1	Top	2 P20	2 P20	2 P20	-	-	-	-	-	-
						43.50		Bottom	2 P20	2 P20	2 P20	-	-	-	-	-	-
						100%		Stirrup	2 P10 300	2 P10 300	2 P10 300						
☐	Roof	B1	☑	400.00	600.00	43.50	Type-1	Top	2 P20	2 P20	2 P20	-	-	-	-	-	-
						43.50		Bottom	2 P20	2 P20	2 P20	-	-	-	-	-	-
						100%		Stirrup	2 P10 300	2 P10 300	2 P10 300						
☐	Roof	B2	☑	400.00	600.00	43.50	Type-1	Top	2 P20	2 P20	2 P20	-	-	-	-	-	-
						43.50		Bottom	2 P20	2 P20	2 P20	-	-	-	-	-	-
						100%		Stirrup	2 P10 300	2 P10 300	2 P10 300						
☐	Roof	B1a	☑	400.00	600.00	43.50	Type-1	Top	2 P20	2 P20	2 P20	-	-	-	-	-	-
						43.50		Bottom	2 P20	2 P20	2 P20	-	-	-	-	-	-
						100%		Stirrup	2 P10 300	2 P10 300	2 P10 300						

→ All groups for "Roof" are displayed.

Section Table

• Design information is managed on a group basis. The role of 'Section Table' is as follows.

1. The material, section, and rebar information can be modified to run the design, and the design results can be checked based on the modified information.
2. It supports freely creating a new group name and changing the selected group to another group name.

Section

Section Group | Assign | Add | Delete | Clear Unused | ※ Blue Text : Section group contains different input data in Section, Rebar and etc.

-	Story	Section Group	Story Group	Material		Section B (mm)	Section D (mm)	Section Cover Space	Type	Position	Rebar END(I)			Rebar MIDDLE			Rebar END(J)			Force END(I)	Force MIDDLE	Force END(J)	Ratio END(I)	Ratio MIDDLE	Ratio END(J)	Spacing END(I)	Spacing MIDDLE	Spacing END(J)
☐	Roof	G1	☑	Fck	30	400.00	600.00	43.50	Type-3	Top	3	D22		3	D22		3	D22		170.84	12.83	223.56	OK(0.649)	OK(0.049)	OK(0.850)	OK(0.728)	OK(0.728)	OK(0.728)
				Fy	500			43.50		Bottom	3	D22		3	D22		3	D22		52.94	238.64	37.17	OK(0.201)	OK(0.907)	OK(0.141)	OK(0.728)	OK(0.728)	OK(0.728)
				Fys	400			100%		Stirrup	2	D10	250	2	D10	250	2	D10	250	142.07	153.19	153.19	OK(0.588)	OK(0.635)	OK(0.635)	OK(0.933)	OK(0.933)	OK(0.933)
☐	3F	G1	☐	Fck	30	400.00	600.00	43.50	Type-2	Top	3	D22		3	D22		3	D22		211.77	27.36	217.36	OK(0.805)	OK(0.104)	OK(0.000)	OK(0.728)	OK(0.728)	OK(0.000)
				Fy	500			43.50		Bottom	3	D22		3	D22		3	D22		37.33	221.50	35.04	OK(0.142)	OK(0.842)	OK(0.000)	OK(0.728)	OK(0.728)	OK(0.000)
				Fys	400			100%		Stirrup	2	D10	250	2	D10	250	2	D10	250	150.78	138.77	154.27	OK(0.625)	OK(0.575)	OK(0.000)	OK(0.933)	OK(0.933)	OK(0.000)
☐	2F	G1	☑	Fck	30	400.00	600.00	43.50	Type-2	Top	3	D22		3	D22		3	D22		206.11	40.71	236.29	OK(0.783)	OK(0.155)	OK(0.000)	OK(0.728)	OK(0.728)	OK(0.000)
				Fy	500			43.50		Bottom	3	D22		3	D22		3	D22		54.58	227.24	45.18	OK(0.207)	OK(0.864)	OK(0.000)	OK(0.728)	OK(0.728)	OK(0.000)
				Fys	400			100%		Stirrup	2	D10	250	2	D10	250	2	D10	250	145.74	145.45	149.69	OK(0.604)	OK(0.602)	OK(0.000)	OK(0.933)	OK(0.933)	OK(0.000)

Smart Design | Check(F5) | Report ... | Apply(F3) | Excel | Auto Resize

Section Table

- **"Section Group" Box** : Enter a new group name or select an existing group name.
- **Assign** : Change the groups checked in the table to the group name selected in the "Section Group" box.
- **Add** : Add a new group name. To add, enter the group name in the "Section Group" box.
- **Delete** : Delete a group names. If the group names were assigned the members, they cannot be deleted.
- **Clear Unused** : Deletes all unassigned Group names at once.

- **Table Colum**
  - "**-**" : Select a target Group for a design and change of the group name.
  - **Story** : Displays the location(story) to which the group belongs.
  - **Section Group** : Displays the assigned group name.
  - **Story Group** : Set a group between stories. When selected, as shown in the image above, G1 of 2F and 3F have the same design information, and G1 of Roof has separate design information.
    When creating a drawing, 2F and 3F are created as one cross-section, and when the cross-section is exported to Gen, the cross-section is set for the 2F and 3F. (See the tutorial for the batch beam design.)
  - **Material** : Enter the material of the group.
  - **Section** : Enter the dimensions of the cross-section and cover. (Only rectangular and circular shapes are supported.)
  - **Type** : Select the type of rebar arrangement.
    → Type-3 : End(i) – Middle - End(j) Type-2 : Both End – Middle Type-1: All(one) Section
  - **Position** : Displays the position on the cross-section corresponding to rebar and force information
  - **Rebar** : Enter information about the rebar.
  - **Force** : Display representative forces for the design force of all members included in the group.
  - **Ratio** : Display Design ratios for axial, bending, and shear forces (Design force / Design strength).
  - **Spacing** : Display the ratio between the spacing limit of rebar based on the code and the inputted rebar spacing.

NOTE

What do the colors of cell and Text mean?

White Cell
- Activated. (Can be edited)

Blue Text (Bold)
- The members that make up the group each have different information, So the representative values are output.

-	Story	Section Group	Story Group	Material Fck (MPa)	Material Fy (MPa)	Material Fys (MPa)	Section Shape	Section Width (mm)	Section Height (mm)	Main Bar Splice	Main Bar No.	Main Bar Rows	Main Bar Name	Main Bar Cc (mm)	Corner Use	Corner Name	Hoop Bar End User	Hoop Bar End Name	Hoop Bar End Space (mm)	Hoop Bar Middle Name	Hoop Bar Middle Space (mm)	Force Axial + Moment Pu (kN)	Force Axial + Moment Mux (kN.m)	Force Axial + Moment Muy (kN.m)	Force Shear Pux (kN)	Force Shear Vux (kN)	Force Shear Puy (kN)	Force Shear Vuy (kN)
☐	5F	Column	☑	30	500	400	Rectangle	500.00	500.00	0%	8	3	P20	63.50	☐		☑	P10	210.00	P10	210.00	72.01	-357.05	87.47	0.00	0.00	0.00	0.00
☐	4F	Column	☑	30	500	400	Rectangle	500.00	500.00	0%	8	3	P20	63.50	☐		☑	P10	210.00	P10	210.00	-267.34	-362.64	49.21	0.00	0.00	0.00	0.00
☐	3F	Column	☑	30	500	400	Rectangle	500.00	500.00	0%	8	3	P20	63.50	☐		☑	P10	210.00	P10	210.00	-476.81	354.55	-48.66	0.00	0.00	0.00	0.00
☐	2F	Column	☑	30	500	400	Rectangle	500.00	500.00	0%	8	3	P20	63.50	☐		☑	P10	210.00	P10	210.00	2446.09	-190.58	168.59	0.00	0.00	0.00	0.00
☐	1F	Column	☑	30	500	400	Rectangle	500.00	500.00	0%	4	2	P20	63.50	☐		☑	P10	300.00	P10	300.00	1000.00	1000.00	0.00	886.62	59.16	886.62	50.79

Red Text
- Conditions required for design are not met
  - Strength, Rebar details, Serviceability

Green Cell
- Cell is selected. (Can be edited)

Gray Cell
- Deactivated. (Cannot be edited)

Member Table

- Display the design information about members constituting the group selected in the section table.
  - Section Information : Section, material, and rebar information
  - Design Information : Design force, design ratio and spacing for shear bar

Member Information

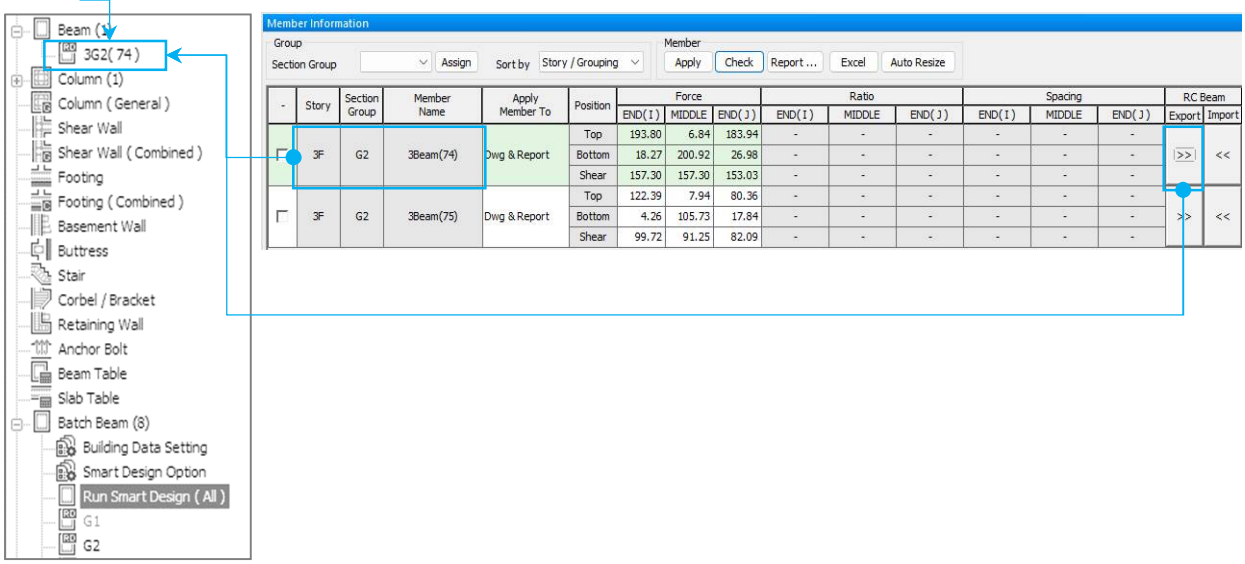
Group — Section Group [ ] Assign — Sort by [Story / Grouping] — Member: Apply | Check | Report ... | Excel | Auto Resize

-	Story	Section Group	Member Name	Apply Member To	Position	Force			Ratio			Spacing			RC Beam	
						END(I)	MIDDLE	END(J)	END(I)	MIDDLE	END(J)	END(I)	MIDDLE	END(J)	Export	Import
☐	3F	B100	3Beam(62)	Dwg & Report	Top	101.97	25.59	88.95	OK(0.468)	OK(0.118)	OK(0.409)	OK(0.736)	OK(0.736)	OK(0.736)	>>	<<
					Bottom	36.38	36.38	33.71	OK(0.167)	OK(0.127)	OK(0.155)	OK(0.736)	OK(0.491)	OK(0.736)		
					Shear	76.97	49.78	74.21	OK(0.307)	OK(0.198)	OK(0.296)	OK(0.932)	OK(0.932)	OK(0.932)		
☐	3F	B100	3Beam(63)	Dwg & Report	Top	95.63	23.48	97.62	OK(0.439)	OK(0.108)	OK(0.448)	OK(0.736)	OK(0.736)	OK(0.736)	>>	<<
					Bottom	26.09	27.37	27.37	OK(0.120)	OK(0.096)	OK(0.126)	OK(0.736)	OK(0.491)	OK(0.736)		
					Shear	73.59	46.58	73.78	OK(0.293)	OK(0.186)	OK(0.294)	OK(0.932)	OK(0.932)	OK(0.932)		

Member Table

- **"Section Group" Box** : Select Group Name.
- **Assign** : Change the selected groups in the table to the group name selected in the "Section Group" Box.
- **Sort by** : Select how to sort members according to the purpose of design. When sorting according to the design ratio, you can easily determine the separation or change of the group by checking the design results between members.
- **Apply** : Applies the modified value (design force) to the member.
- **Check** : A design check is performed according to the design information of group.

- **Table Colum**
  - "-" : Select a target Group for design and change of group name.
  - **Story** : Displays the location(story) to which the group belongs.
  - **Section Group** : Displays the assigned group name.
  - **Member Name :** Story Name + Section Name in Gen + (Element No in Gen)
    It is used when exporting as a "RC Beam" or "RC Column" of D+. (See the image below.)
  - **Force** : Display representative forces for the design force of all members included in the group.
  - **Ratio** : Display Design ratios for axial, bending, and shear forces (Design force / Design strength).
  - **Spacing** : Display the ratio between the spacing limit of rebar based on the code and the inputted rebar spacing.
  - **RC Beam (or Column)** :
    1) **Export** : The design in detail can be reviewed by exporting design information to RC beam or column of Design+.
    → Exported name : Story Name + Group Name + (Element No in Gen)
    2) Import : After detailed review in "RC Beam" or "RC Column", the design results can be imported to Batch design.



02 Main Features

Preview

- In the preview window, each story's structural plan and design information are output.
- In Preview,
  - Check the group name, rebar information, and design Result (Ratio)
  - Change the group name directly.
  - Link with the member table: check on/off for the selected members in preview

Section Group

- The element numbers selected in Gen are entered. And change the selected element in Gen to the new or the other group name.

Member

- Display the member(group) name and end release symbol. If a section shape is checked on, the beam lines are output in a double layer.

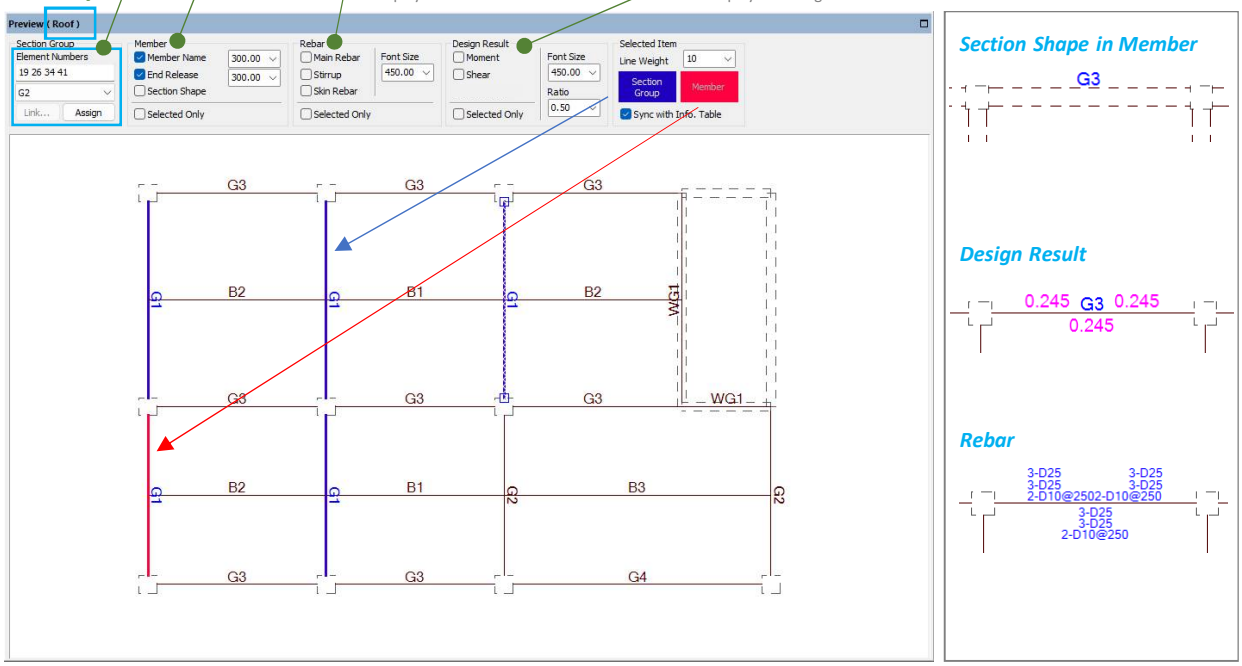
Rebar

- Display the rebar information.

Design Result

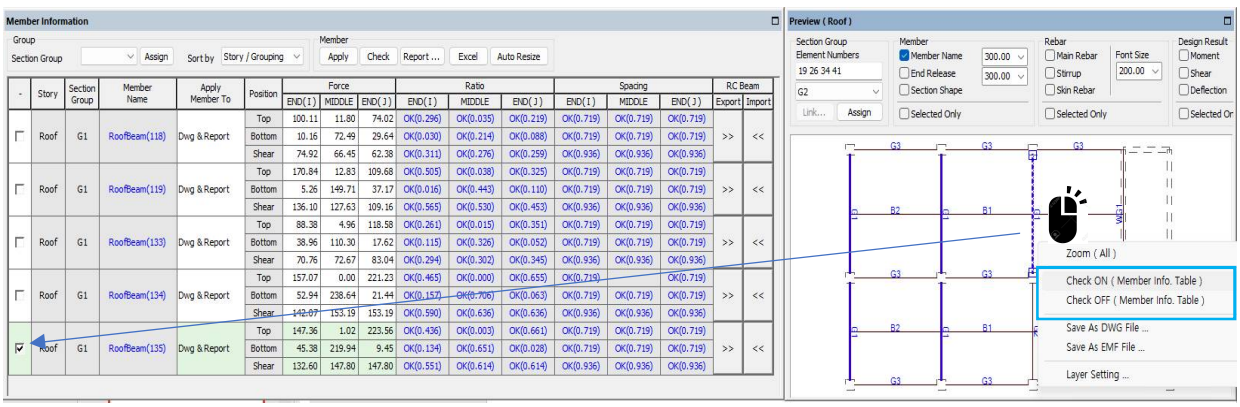
- Display the design ratio.

Story



Preview

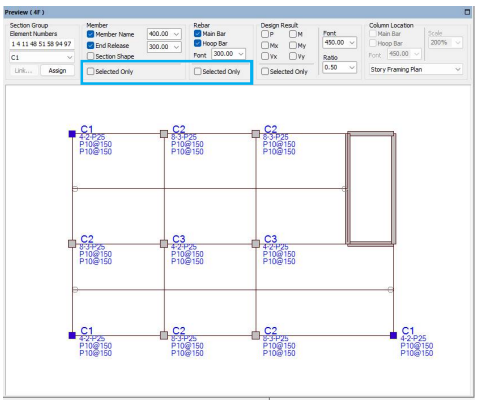
- If checking on/off one or more members selected in the preview as shown below, the corresponding members are checked on/off in the member table.
  → It is used to change the group name of members selected in the preview.



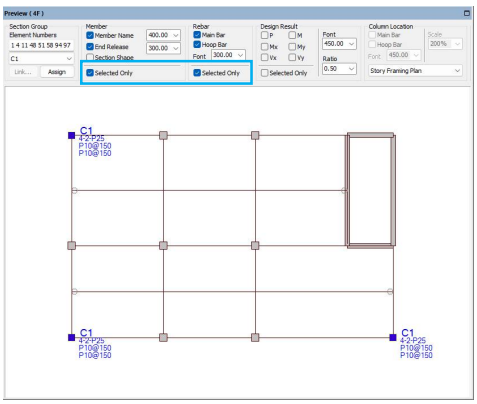
Connection between Preview and Member Table

Preview

• **Selected Only** : Only information about the group selected in the section table is output.

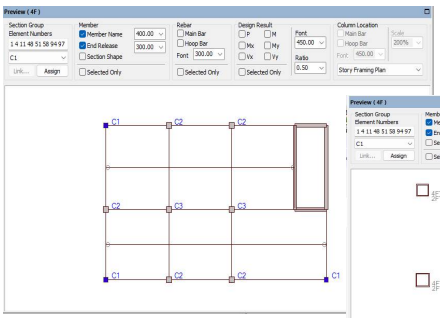


When checking off "Selected Only"



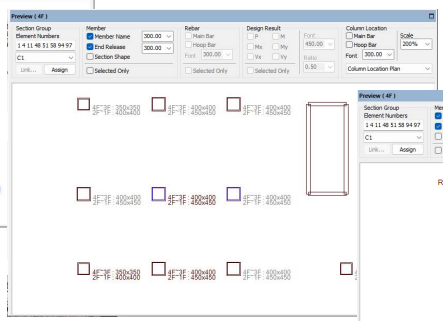
When checking on "Selected Only"

• **View Type** : the information for columns is provided in three types as follows. It is supported only in batch columns.



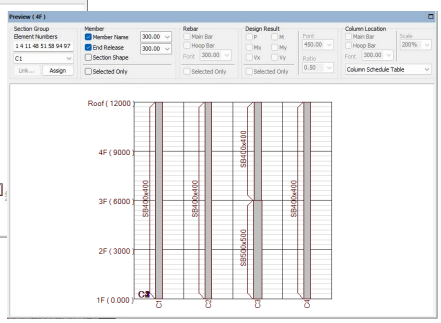
Story Frame Plan

- Group Name
- Rebar Information
- Design Result (Ratio)



Column Location Plan

- Group Name
- Column outline for all story
- Story & Size

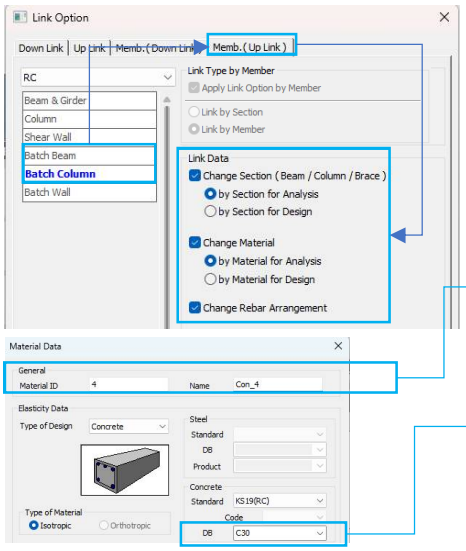


Column Schedule Table

- Group Name
- Column outline for all story
- Story & Size

NOTE

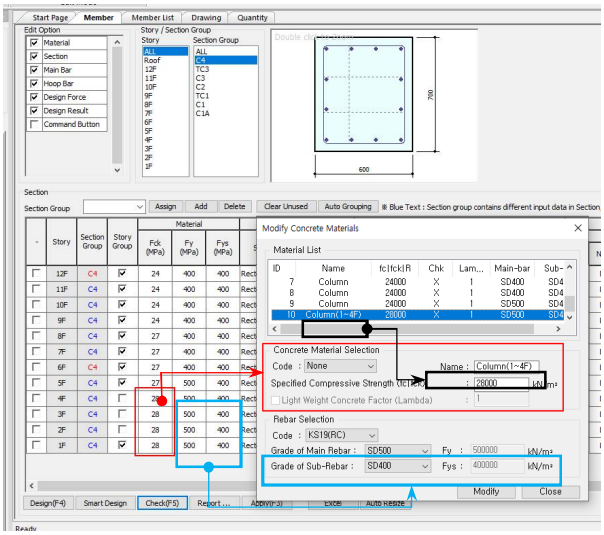
How to export the material data of batch design to Gen model.



- First, the link option (“Up Link” tap) should be set before exporting to Gen.
  - For Analysis(recommendation) : Update the concrete & rebar materials and sections in the batch design to Gen
  - For Design : Update only the concrete & rebar for design and section for design to Gen (not update materials and sections for the analysis model)

- New materials added by modifying the material in ‘Batch Design’ are added to the material list of Gen according to the rules below.
  → Con_(added Material ID number)

- For added materials, material DB is automatically assigned by finding the DB matched to the concrete strength of ‘Batch Design’. If there is no same DB, the user type(“None”) in DB is set and the calculated values are inputted in properties.



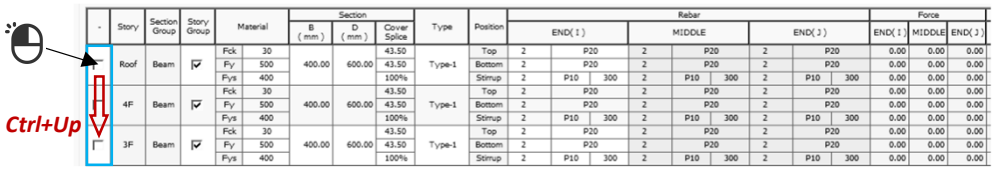
- Design strength is controlled in the “Modify Concrete Material” function as shown in the image below.
  - In the case of concrete, the code is set to “None” and the name is applied the same as the material name.
  - The strength of concrete is determined by ‘Fck’ value of batch design.
  - The strength of the Rebar is automatically assigned by finding the DB with the value most similar to the rebar strength of Batch Design.

Shear Design at middle of column

- The shear design at the middle of the column is not supported.
- When performing the design, The diameter and spacing of a hoop at the middle follow these of the end
- Therefore, the user has to input the hoop’s spacing at the middle.

How to check on the lists in table quickly

- After clicking the target box, use the shortcut key : Ctrl + Up or Down key



CONTENTS

03.

Tutorial - Batch Beam Design

USER GUIDE

STEP 01

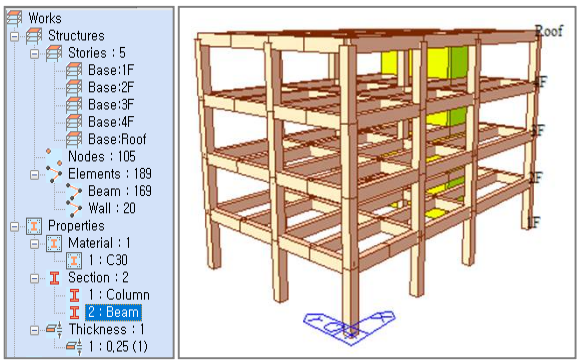
Set in midas Gen

Example Model

Building Information

Magnitude		4-Story
Floor Load	Roof	DL : 10kN/m² LL :3kN/m²
	2F~4F	DL : 6kN/m² LL :3kN/m²

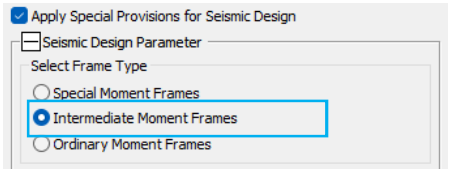
• For beams, create and assign only the “Beam” (400*600) in the section list.



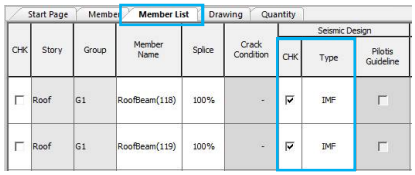
Design Conditions

• Batch design is executed by receiving design information from Gen, so design setting and code design or code checking must be performed in Gen first.
• Some of the setting information below is reflected in the batch design settings of Design+, so confirmation is required.

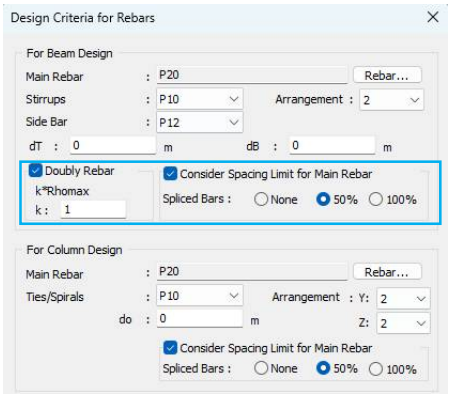
- Seismic Design Parameter in Design Setting.



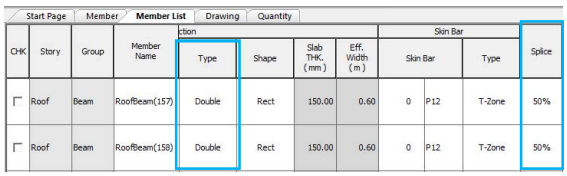
Batch Beam > Member List



- Seismic Design Parameter in Design Setting.



Batch Beam > Member List



• If rebar information exists in Gen, this information is exported to a batch design even if ‘Code Design’ in Gen is run. If there is none, the rebar information by ‘Code Design’ is exported.

Import from Gen

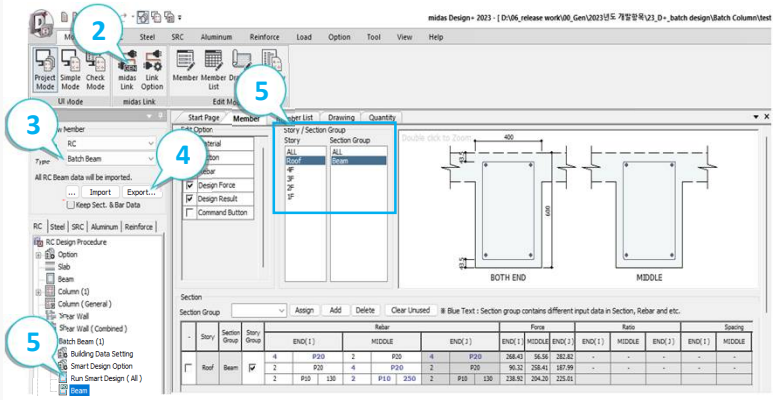
1. Change the design code and Rebar DB.
   (EN and IS codes are not supported.)

2. Click “midas Link” and select the target midas Gen.

3. Select “Batch Beam” in type.

4. Click “Import”.

5. Check the imported information in the tree and Story/Section Group box.



TIP

If using the dual or large monitor, it is efficient to re-arrange the member table and preview window. (See Page 4.)

6. Double-click “Building Data Setting”.

7. Modify the design information for each story in batches.

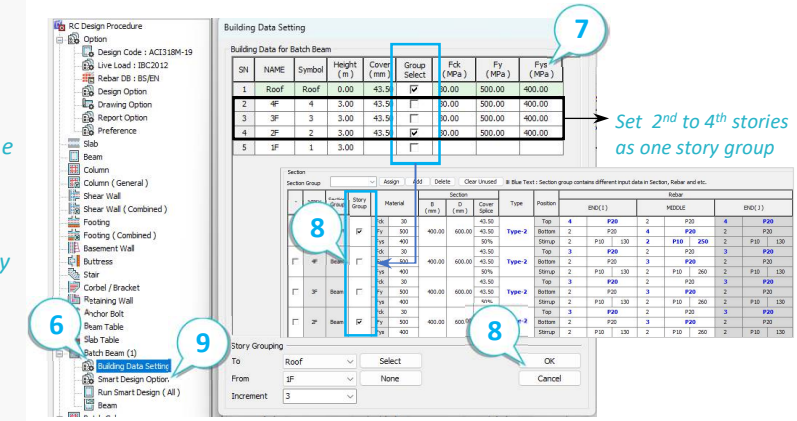
TIP

Group Select

- Since the same floor load is applied to the 2nd to 4th stories, these stories are set as one group.

- How to generate a story group
: If setting the 2nd to 4th stories as one story group, check on only the lowest story, 2F, and set the upper stories to off.

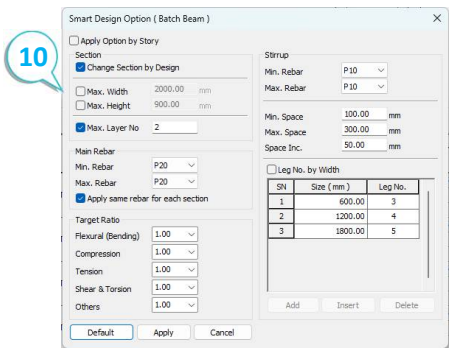
- What is a story group?
: This function groups stories that are judged to have similar structural plans and design results due to the same floor load being applied. And the same design information is applied in the story group.



8. Click “O.K.” and check the story group in the section table.

9. Double-click “Smart Design Option”.

10. Modify the design condition for smart design.



STEP 03

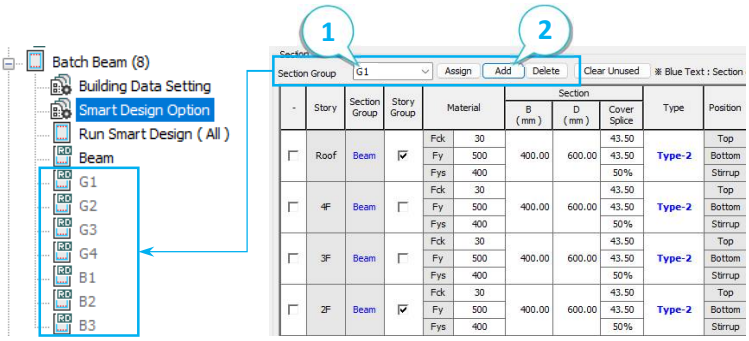
Generation of Beam Group

1. Input the new group name.

2. Click “Add”

TIP

Creating multiple group names in advance would be efficient by repeating 1 and 2.



3. Select the target Members in the preview.

4. Click “Check on (Member Info. Table)” and check the selection status in the member table.

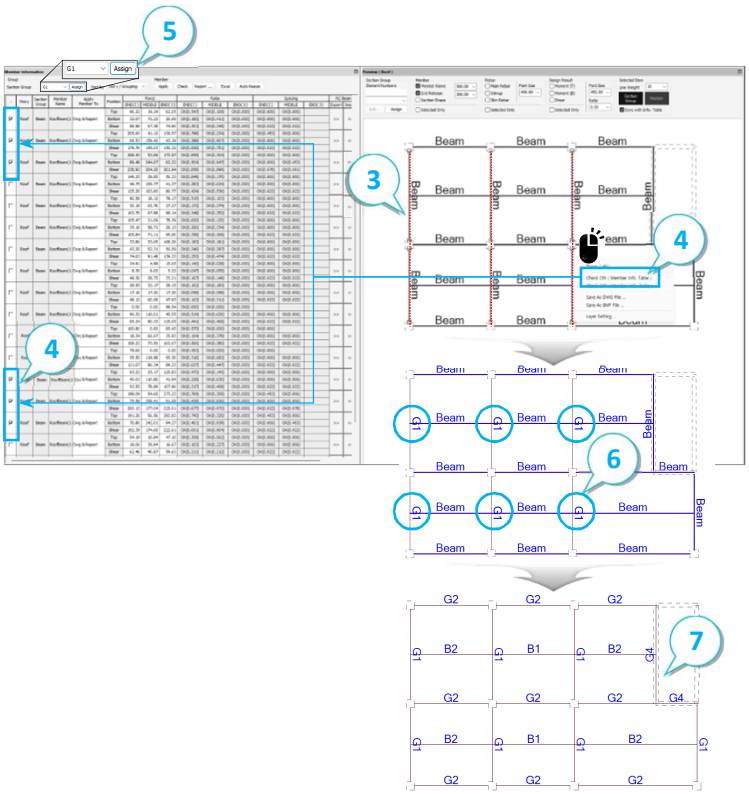
5. Select the target group name and click “Assign”

6. Check the modified group name.

7. Repeat 3~6 step.

TIP

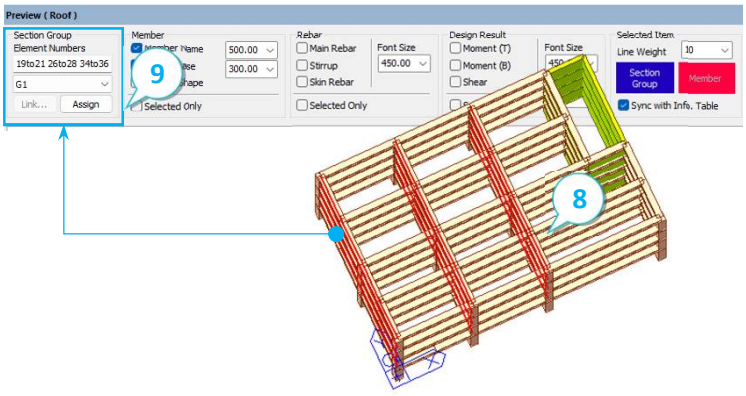
3 to 7 are roughly the process of creating a group based on the engineer’s judgment.



TIP

In Preview, the grouping work must be done one story at a time, so it takes much time to edit all stories.

If the link with Gen is maintained, select target members from Gen as shown on the right (⑧). Then the selected element No. is entered in Preview((⑨). Afterward, select the group name and click Assign(⑨). To edit multiple stories at once it is the more efficient method by using the Gen model.

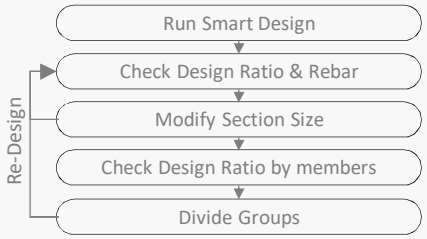


STEP 04

Detailed Grouping

MIDAS

The sequence of detailed grouping task



** The above sequence is an example of a general procedure and can be used for various purposes and methods.*

1. Select "All" in the story box and target group name in the section group box

2. Run "Smart Design"

TIP

If all groups or members are checked off in "-", the design is performed with all.

3. Adjust the cross-section size by referring to the design result and the amount of rebar and perform "Smart Design" again. Determine the cross-section through the repeat of 2-3.

4. Check on design result in Preview and enter 0.7 in Ratio.

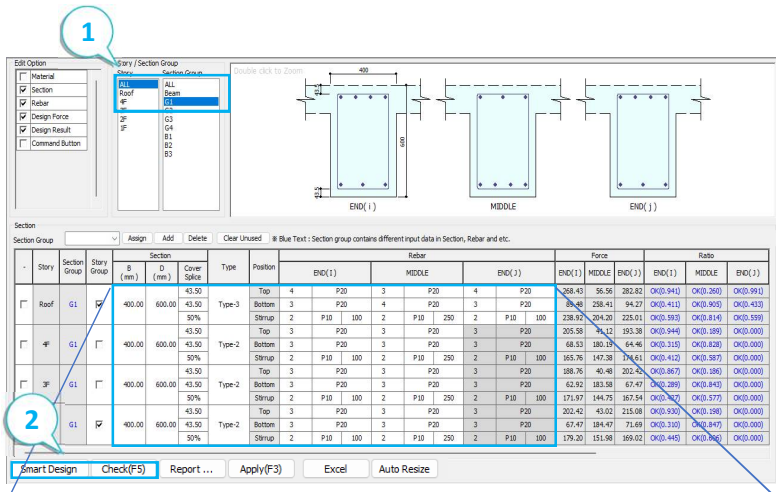
TIP

If it is greater than the ratio, it is displayed in blue; if it is less than the ratio, it is displayed in pink. If it is over 1.0. the text is displayed in red.

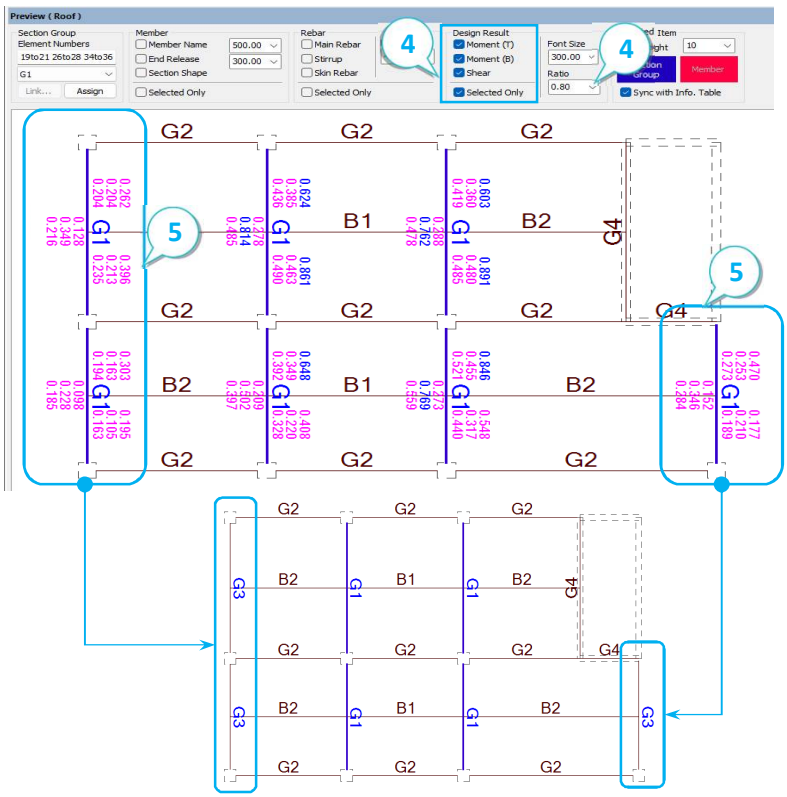
The ratio is helpful when finding members in a group whose design results are significantly different and assigning them to a different group name.

5. Select members with results smaller than the ratio and assign them to another group. Conversely, the members with results greater than the ratio can be assigned to another Group.

6. Repeat 1 to 5 to perform a detailed grouping task.

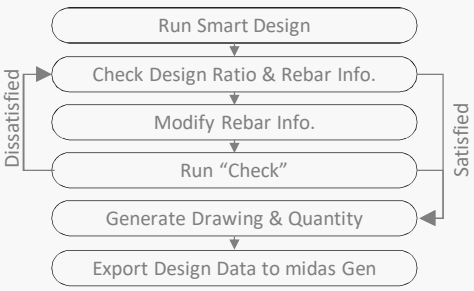


-	Story	Section Group	Story Group	Material		Section B (mm)	Section D (mm)	Section Cover Splice	Type	Position	Rebar END(I)		Rebar MIDDLE	
☐	Roof	G1	☑	Fck	30	400.00	550.00	43.50	Type-2	Top	5	P20	3	P20
				Fy	500			43.50		Bottom	3	P20	5	P20
				Fys	400			50%		Stirrup	2	P10 71	2	P10 100
☐	4F	G1	☐	Fck	30	350.00	500.00	43.50	Type-2	Top	4	P20	3	P20
				Fy	500			43.50		Bottom	3	P20	4	P20
				Fys	400			50%		Stirrup	2	P10 59	2	P10 100
☐	3F	G1	☐	Fck	30	350.00	500.00	43.50	Type-2	Top	4	P20	3	P20
				Fy	500			43.50		Bottom	3	P20	4	P20
				Fys	400			50%		Stirrup	2	P10 59	2	P10 100
☐	2F	G1	☑	Fck	30	350.00	500.00	43.50	Type-2	Top	4	P20	3	P20
				Fy	500			43.50		Bottom	3	P20	4	P20
				Fys	400			50%		Stirrup	2	P10 59	2	P10 100



Detailed Design & Drawing & Quantity

The sequence of detailed design



1. Run "Smart Design".

2. Check the design result & rebar Info.

3. Modify the rebar Info.

4. Click "Check"

5. Repeat 2~4 until the design is satisfied.

6. Click "Drawing" Tap to generate the beam list drawing.

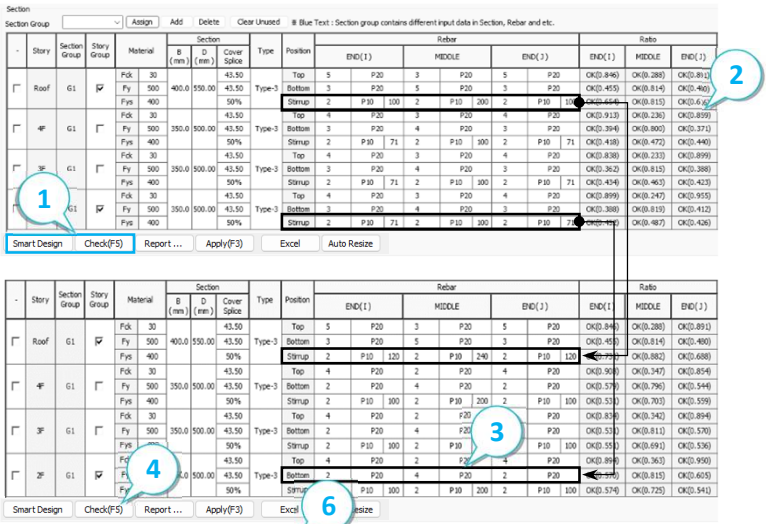
7. Click "Create" button after selecting "RC"-"Batch Beam".

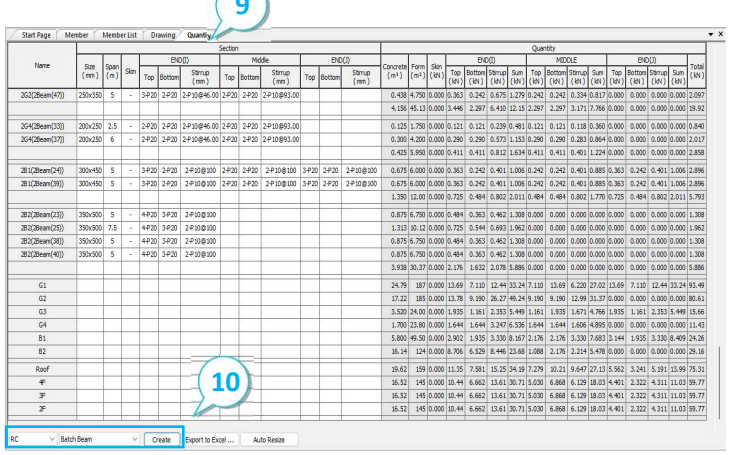
8. Check whether the list has been created according to the story group.

9. Click "Quantity" Tap to generate the beam quantity table.

10 Click "Create" button after selecting "RC"-"Batch Beam".

When reviewing the optimal floor structural system, batch beam design allows a quick design and a quick quantity review.





STEP 06

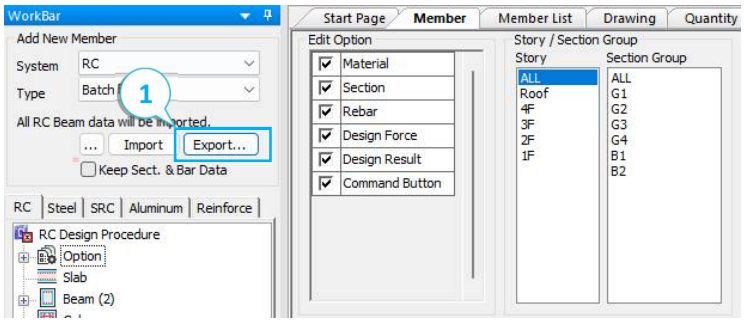
Export to Gen

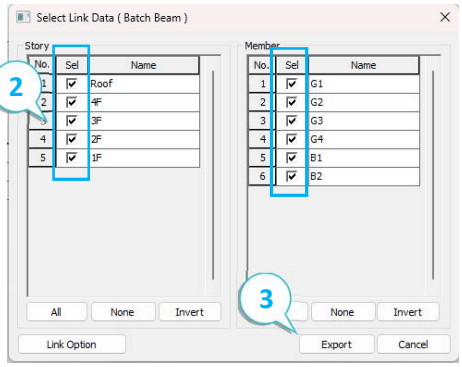
1. Click “Export”.

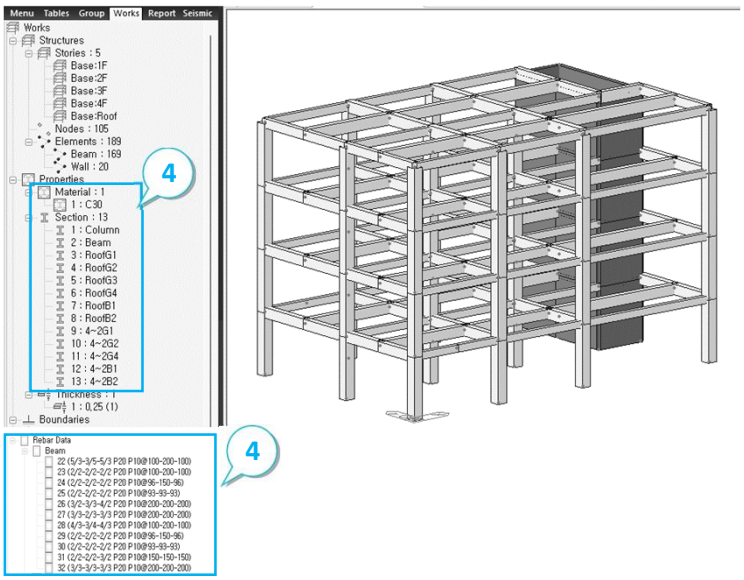
2. Check on the target stories and groups.

3. Click “Export”.

4. Check the uploaded materials, sections, and rebar information.







TIP

When the cross-section and material are modified, the member forces will be changed due to the model’s stiffness changes. So the design results must be checked again through re-analysis and re-design (Code Check).

Alternatively, Batch beam design can be used to re-design and upgrade design data again.

CONTENTS

04.

Tutorial - Batch Column Design

USER GUIDE

STEP 01

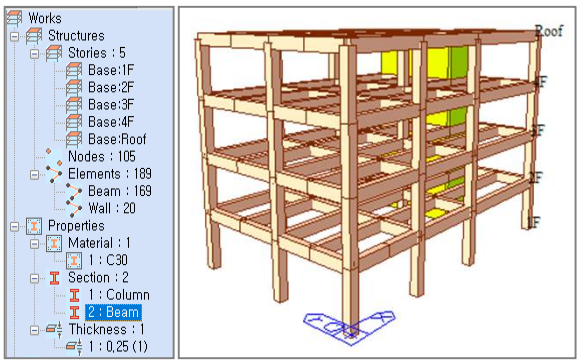
Set in midas Gen

Example Model

Building Information

Magnitude		4-Story
Floor Load	Roof	DL : 10kN/m² LL :3kN/m²
	2F~4F	DL : 6kN/m² LL :3kN/m²

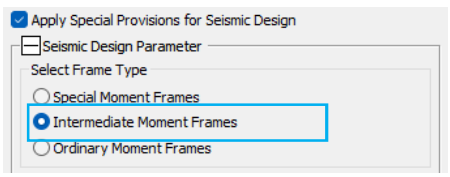
• For Columns, create and assign only the “Column” (500*500) in the section list.



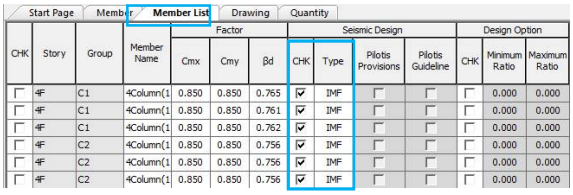
Design Conditions

• Batch design is executed by receiving design information from Gen, so design setting and code design or code checking must be performed in Gen first.
• Some of the setting information below is reflected in the batch design settings of Design+, so confirmation is required

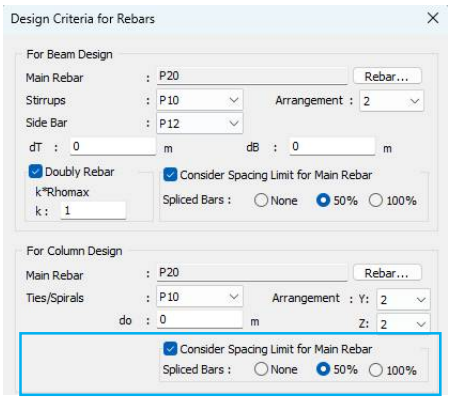
- Seismic Design Parameter in Design Setting.



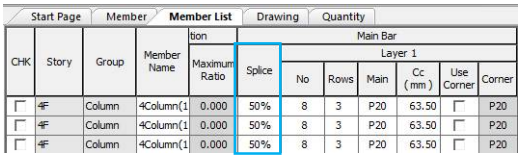
Batch Column > Member List



- Seismic Design Parameter in Design Setting.



Batch Column > Member List



• If rebar information exists in Gen, this information is exported to a batch design even if ‘Code Design’ in Gen is run. If there is none, the rebar information by ‘Code Design’ is exported.

STEP 02

Import from Gen

1. Change the design code and Rebar DB.
   (EN and IS codes are not supported.)

2. Click “midas Link” and select the target midas Gen.

3. Select “Batch Column” in type.

4. Click “Import”.

5. Check the imported information in the tree and Story/Section Group box.

TIP

If using the dual or large monitor, it is efficient to re-arrange the member table and preview window. (See Page 4.)

6. Double-click “Building Data Setting”.

7. Modify the design information for each story in batches.

TIP

Group Select
- Considering constructability, story groups are set for two group
: 1st to 2nd stories and 3rd to 4th Stories.

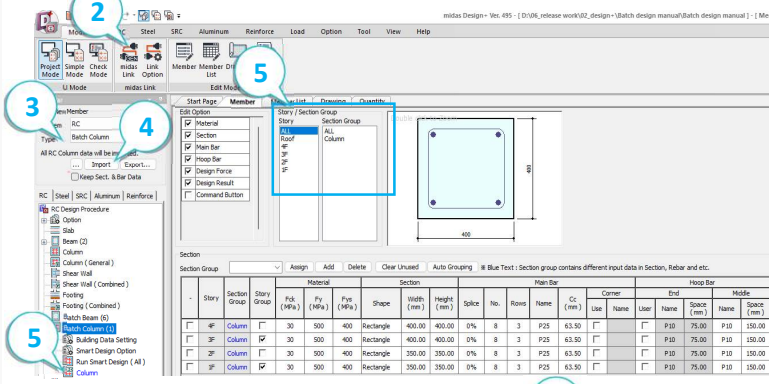
- How to generate a story group
: If setting the 1st to 2nd stories as one story group, check on only the lowest story, 1F, and set the upper stories, 2F, to off.

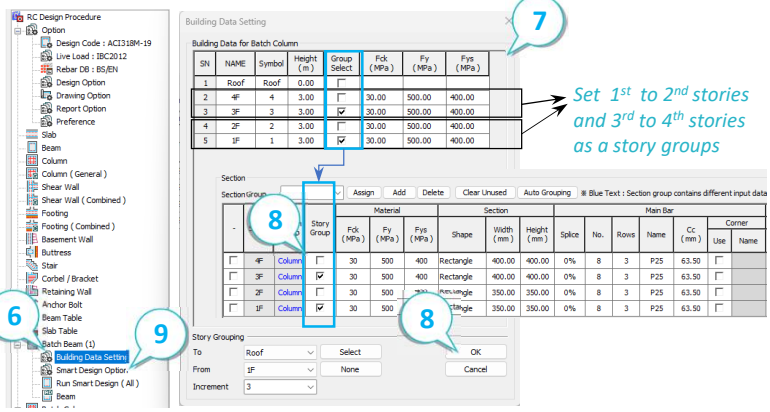
- What is a story group?
: This is a feature that groups together stories that are judged to have similar design results in consideration of constructability.
And the same design information is applied in the story group.

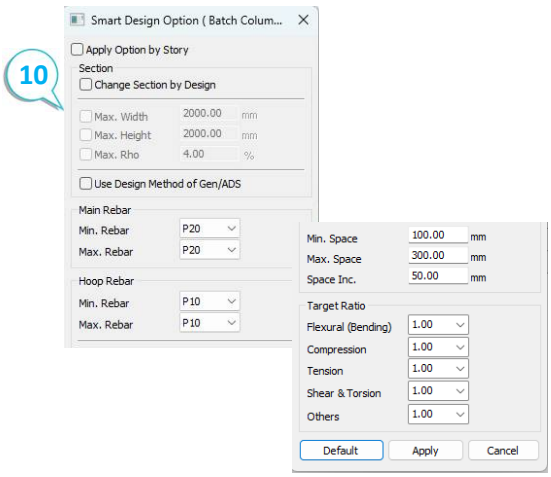
8. Click “O.K.” and check the story group in the section table.

9. Double-click “Smart Design Option”.

10. Modify the design condition for smart design.







NOTE

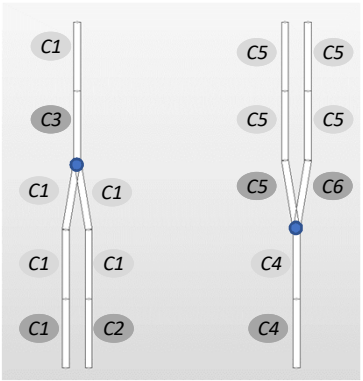
Group Name in Batch Column

1. Setting of Group Name when exporting from Gen to Batch Column

- If it is a continuous column in the Gen model, it is determined to be a connected group and imported as a batch column. The section name of the lowest story of the connected group is automatically set to the group name in the batch column.

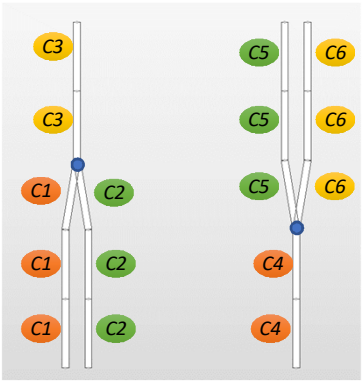
** In the case of continuous columns, they only have the same group name and cannot have different group names on a specific story.*

- If three or more columns are scattered or concentrated, they are not considered a connected group based on the corresponding node.



Section Name & Assignment in Gen

Import from Gen



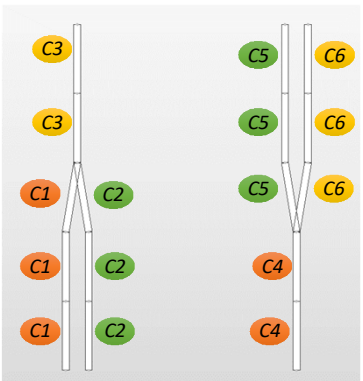
Assignment of Group Name in Design+

2. How to apply the group name in Batch Column

- In principle, continuous columns are applied as the same group.
- Therefore, if the column group name of a specific story is changed, the group name of all story is changed simultaneously.

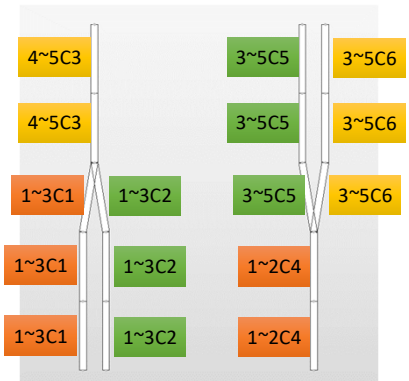
2. How to apply the group name when exporting to Gen

- Depending on the setting of story group, the story number or text is added in front of the group name as follows .



Assignment of Group Name in Design+

Export to Gen



Section Name & Assignment in Gen

STEP 03

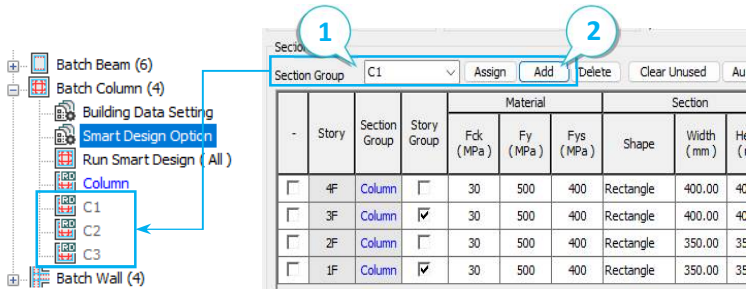
Generation of Column Group

1. Input the new group name.

2. Click “Add”

TIP

Creating multiple group names in advance would be efficient by repeating 1 and 2.



3. Select the target Members in the preview.

4. Click “Check on (Member Info. Table)” and check the selection status in the member table.

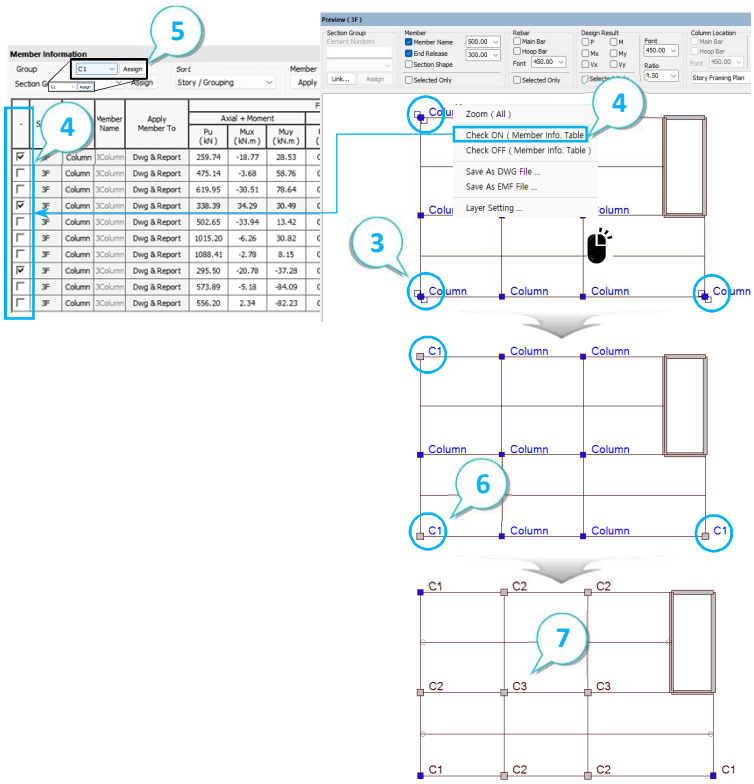
5. Select the target group name and click “Assign”

6. Check the modified group name.

7. Repeat 3~6 step.

TIP

3 to 7 are roughly the process of creating a group based on the engineer’s judgment.

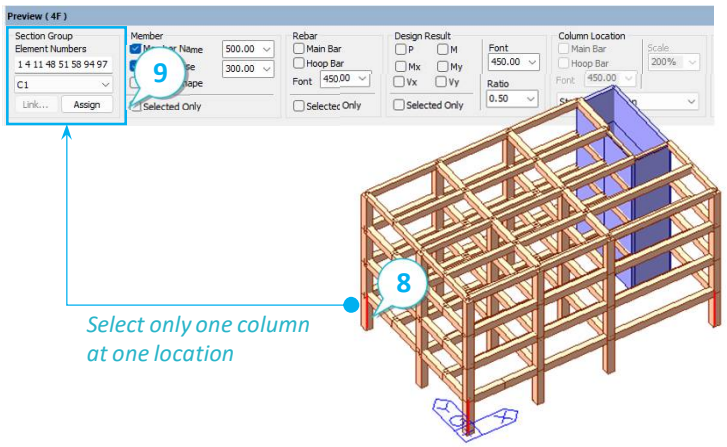


TIP

In Preview, the grouping work must be done one story at a time, so it takes much time to edit all stories.

If the link with Gen is maintained, select target members from Gen as shown on the right (⑧). Then the selected element No. is entered in Preview((⑨). Afterward, select the group name and click Assign(⑨). To edit multiple stories at once it is the more efficient method by using the Gen model.

Since the consecutive columns have the same group name, it is not necessary to select the columns on all story.

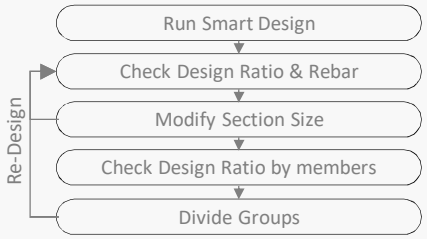


STEP 04

Detailed Grouping

MIDAS

The sequence of detailed grouping task



** The above sequence is an example of a general procedure and can be used for various purposes and methods.*

1. Select "All" in the story box and target group name in the section group box

2. Run "Smart Design"

TIP

If all groups or members are checked off in "-", the design is performed with all.

3. Adjust the cross-section size by referring to the design result and the amount of rebar and perform "Smart Design" again. Determine the cross-section through the repeat of 2-3.

4. Check on design result in Preview and enter 0.7 in Ratio.

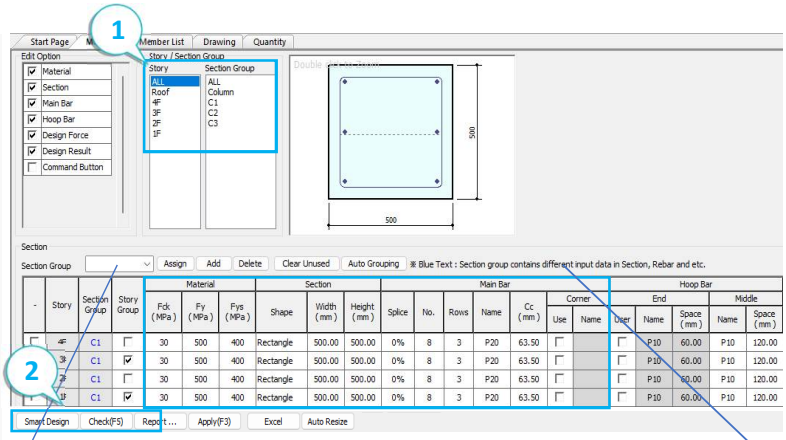
TIP

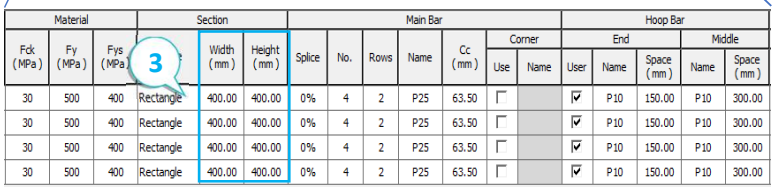
If it is greater than the ratio, it is displayed in blue; if it is less than the ratio, it is displayed in pink. If it is over 1.0. the text is displayed in red.

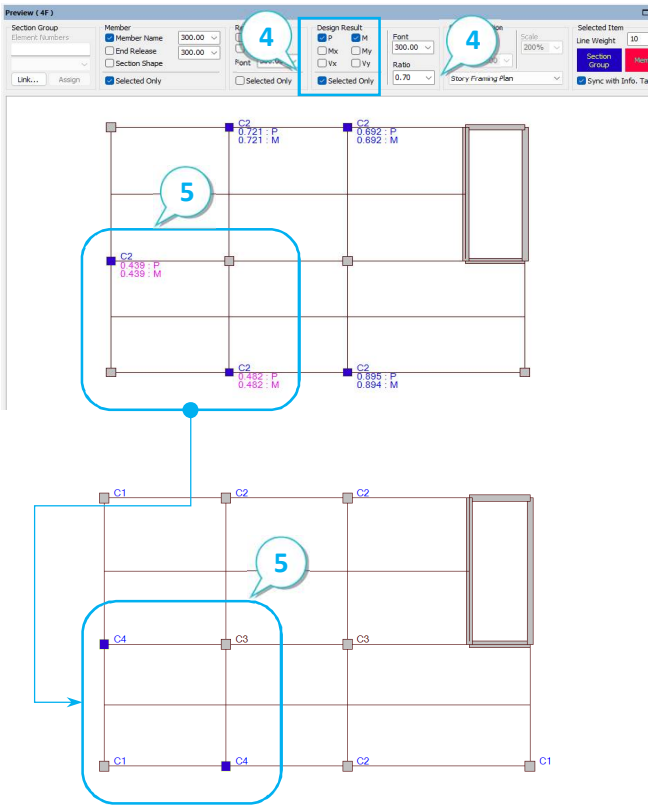
The ratio is helpful when finding members in a group whose design results are significantly different and assigning them to a different group name.

5. Select members with results smaller than the ratio and assign them to another group. Conversely, the members with results greater than the ratio can be assigned to another Group.

6. Repeat 1 to 5 to perform a detailed grouping task.

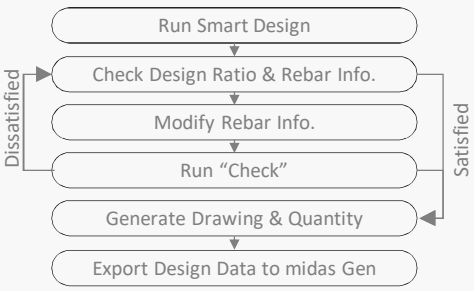






Detailed Design & Drawing & Quantity

The sequence of detailed design



1. Run "Smart Design".

2. Check the design result & rebar Info.

3. Modify the rebar Info.

4. Click "Check"

5. Repeat 2~4 until the design is satisfied.

6. Click "Drawing" Tap to generate the column list drawing.

7. Click "Create" button after selecting "RC"-"Batch Column".

8. Check whether the list has been created according to the story group.

TIP

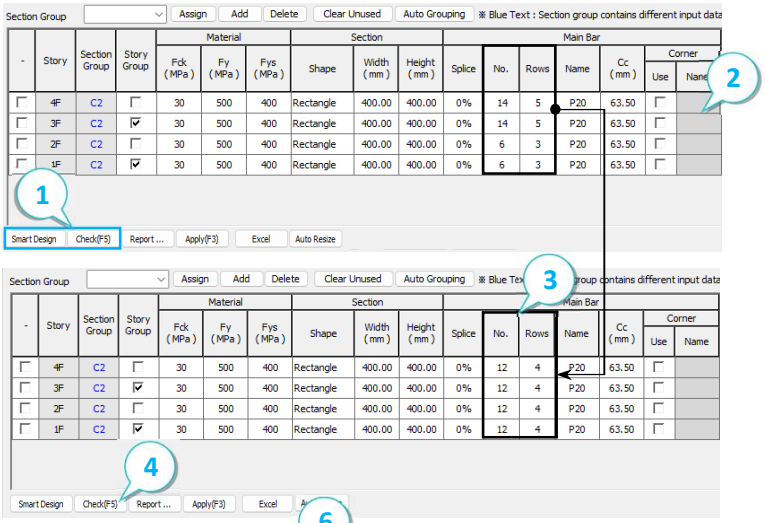
If the cross-section and rebar information are the same, the story name can be output integrated. For example, if C1 has the same section and rebar applied to all stories, the drawing is output as one list with names from 4~1C1.

9. Click "Quantity" Tap to generate the column quantity table.

10 Click "Create" button after selecting "RC"-"Batch Column".

TIP

When reviewing the optimal structural system, batch column design allows a quick design and a quick quantity review.



STEP 06

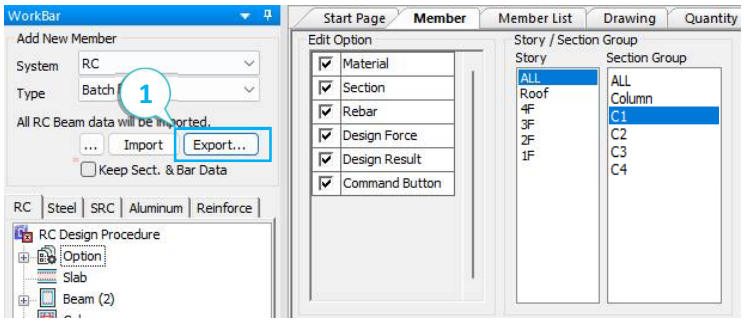
Export to Gen

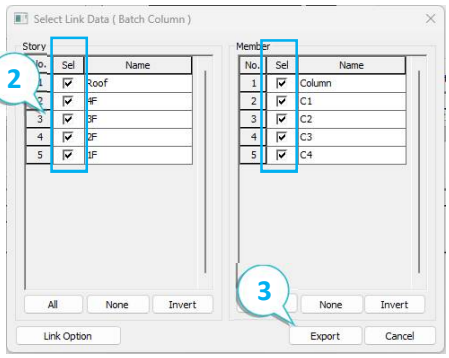
1. Click “Export”.

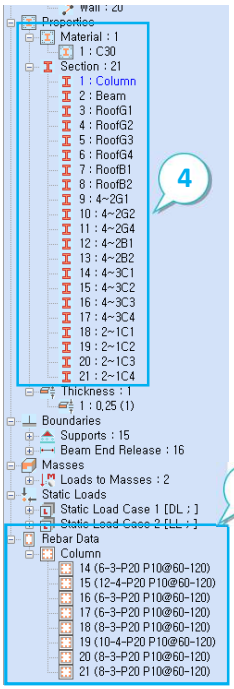
2. Check on the target stories and groups.

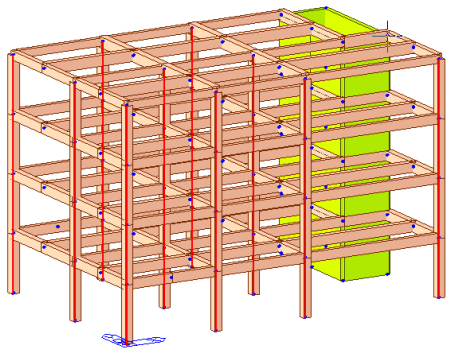
3. Click “Export”.

4. Check the uploaded materials, sections, and rebar information.









TIP

When the cross-section and material are modified, the member forces will be changed due to the model’s stiffness changes. So the design results must be checked again through re-analysis and re-design (Code Check).

Alternatively, batch column design can be used to re-design and upgrade design data again.

Solution for Structural Member Design with Drawing & Report

midas Design+ *2024 (v1.1)*

for Batch Beam & Column Design