Basic workflow steps (each step explained in details on next pages)

4. generate output report

2. list ends of members you are interest

3. Decide what force criteria should be checked to find critical load cases

1. Get beam end results from Staad via clipboard data

1. Geting beam end results from Staad via clipboard data (*)
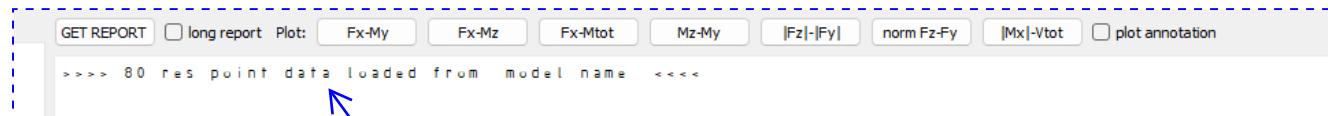
Note - here decide what load combinations you are interested in

A. left click here (at "Beam") to select all data (it turns table in black)

B. .. then right click at table center and "copy" (wait a moment after as it takes some time to copy data into clipboard, after that you should be able to click at the center of this table and makes it gray back)
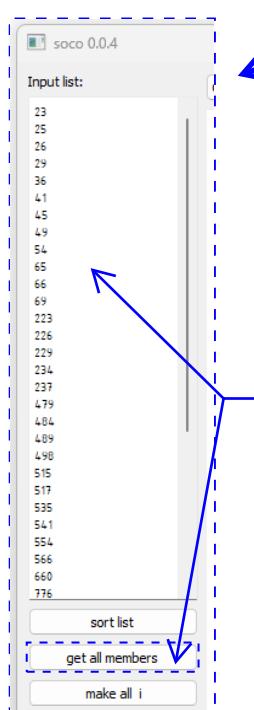
(*) Note. Currently data transfer from Staad is via clipboard by coping Staad tables. This method is a bit not handy and because of "Range too big" issue working with big Staad models is more difficult as you can not transfer entire model results once. The future of SOCO is to use Staad API and solve this issue.

C. go to SOCO

Clipboard data:

>> get beam results

>> get beam numbers

>> get node numbers

D. click on "get beam results" button

GET REPORT ☐ long report Plot: Fx-My | Fx-Mz | Fx-Mtot | Mz-My | |Fz|-|Fy| | norm Fz-Fy | |Mx|-Vtot | ☐ plot annotation

>>>> 80 res point data loaded from model name <<<<
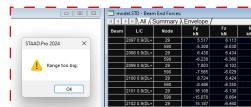
E. you should see confirmation that member results has been received by SOCO

soco 0.0.4

Input list:

```
23
25
26
29
36
41
45
49
54
65
66
69
223
226
229
234
237
479
484
498
515
517
535
541
554
566
660
776
```

sort list

get all members

make all i
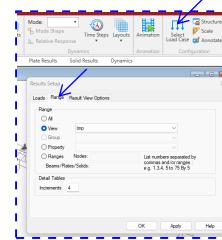
F. you can use "get all members" button to see what member results are available

"Range too big." issue.
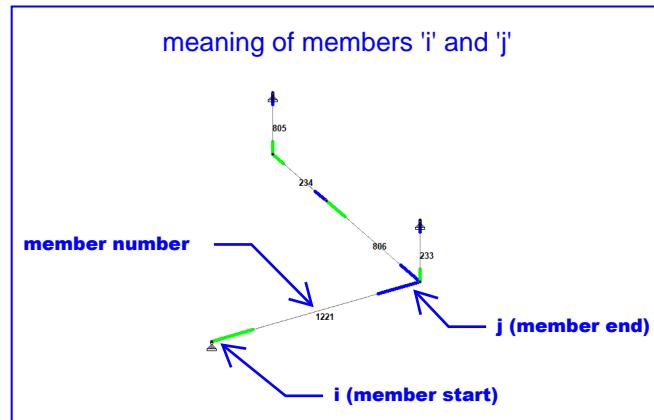
For big models or/and many load combinations results table can be to big to copy all members results for entire. For that case you need to reduce the table size by using some criteria as shown below.


Using 'View' option is most flexible as you can define views in fly with no impact on std file and no need recalculate model when create new view. See below how to crate new named view in Staad.
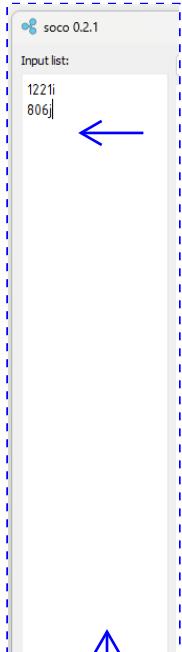
# 2. Listing ends of members you are interested in

meaning of members 'i' and 'j'

member number

805

234

806

233

j (member end)

1221

i (member start)
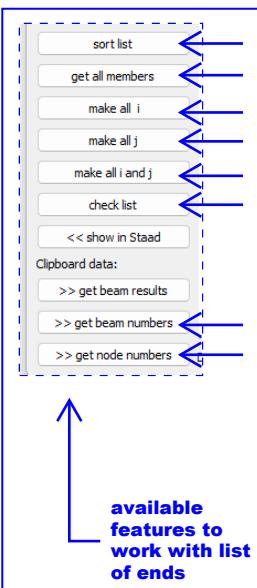
There are two options how to specify list of ends

Option 1. Just write it manually
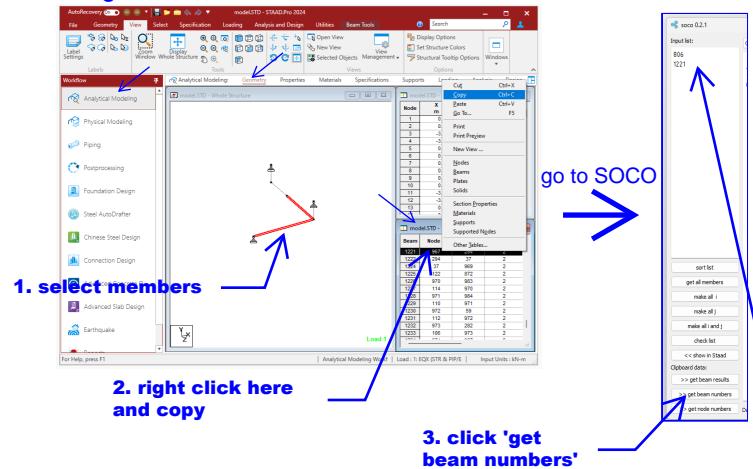
Option 2. Use Soco build in features that make it easer to create and menage the list

soco 0.2.1

Input list:

1221i
806j

List of ends need to be specified here

sort list
get all members
make all i
make all j
make all i and j
check list
<< show in Staad

Clipboard data:
>> get beam results
>> get beam numbers
>> get node numbers

available features to work with list of ends
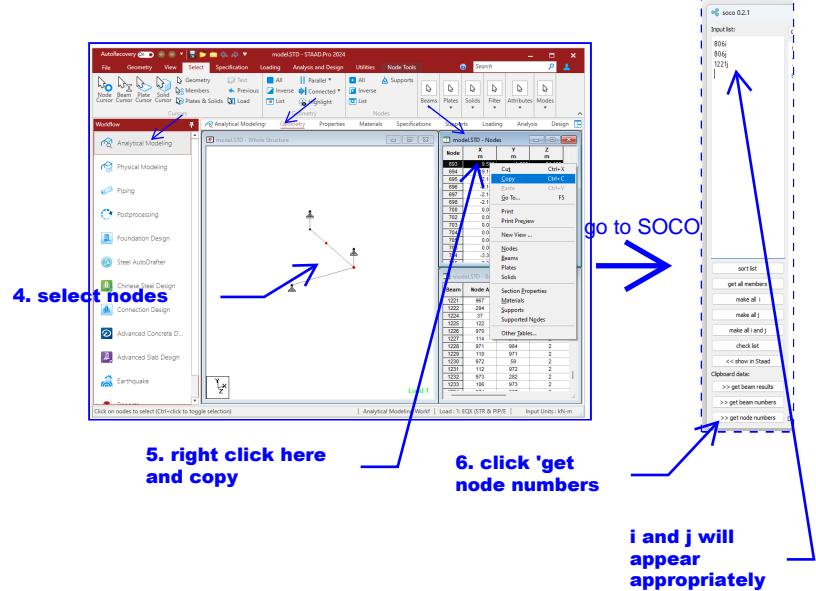
Specifying list of ends based on Staad member and point selection is shown below.

Fist get beam numbers based on Staad selection:

1. select members

2. right click here and copy

3. click 'get beam numbers'

go to SOCO

soco 0.2.1
Input list:
806
1221

beam numbers will appear
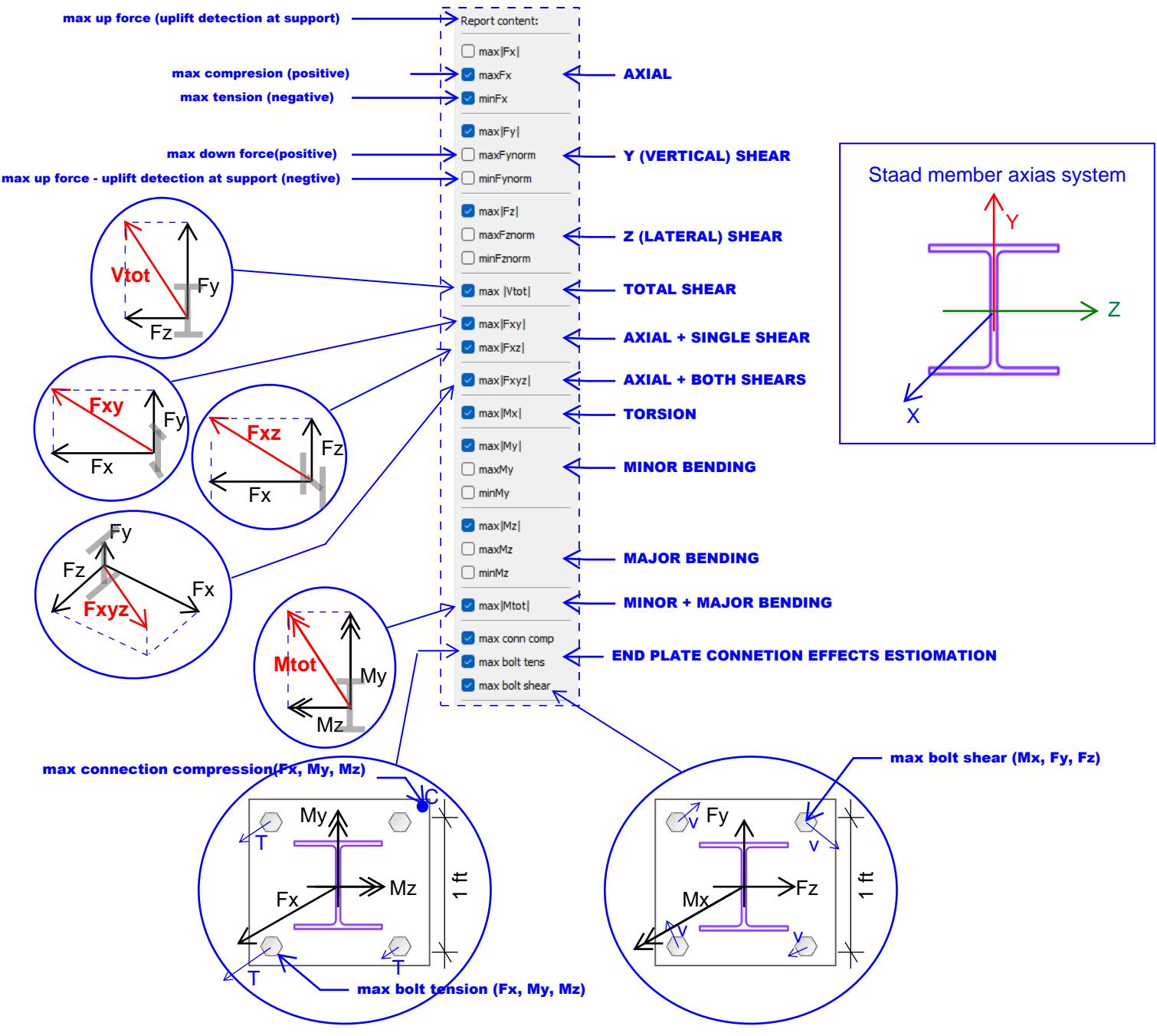
.. then get node numbers based on Staad selection to define beam ends (i, j):

4. select nodes

5. right click here and copy

6. click 'get node numbers'

go to SOCO

soco 0.2.1
Input list:
806i
806j
1221j

i and j will appear appropriately
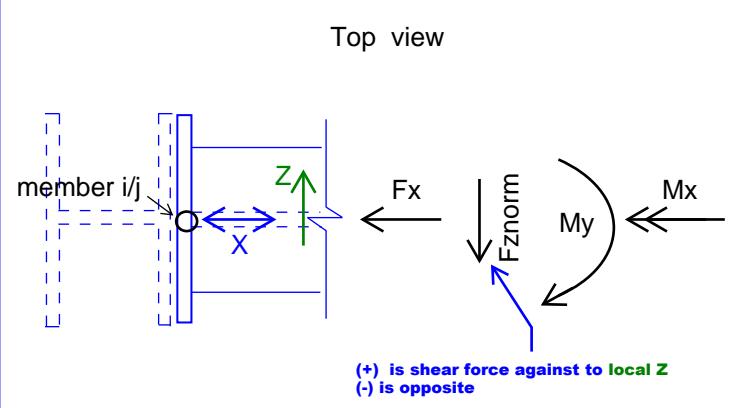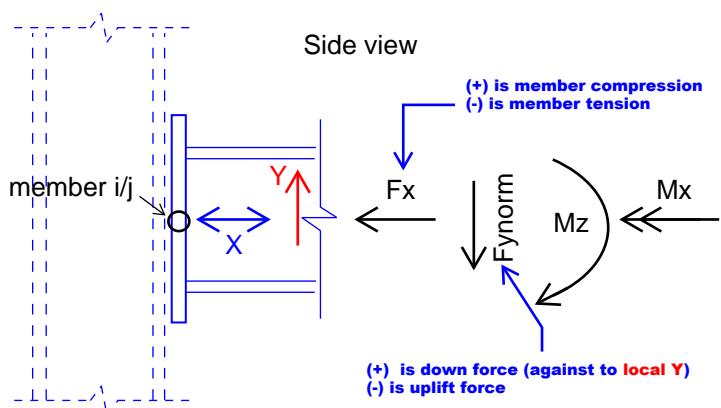
3. Decide what force criteria should be checked to find critical load cases

There are several options that can be selected to get output report, see below.

max up force (uplift detection at support) → **Report content:**
- ☐ max|Fx|
- ☑ maxFx ← max compresion (positive) → **AXIAL**
- ☑ minFx ← max tension (negative)
- ☑ max|Fy|
- ☐ maxFynorm ← max down force(positive) → **Y (VERTICAL) SHEAR**
- ☐ minFynorm ← max up force - uplift detection at support (negtive)
- ☑ max|Fz|
- ☐ maxFznorm ← → **Z (LATERAL) SHEAR**
- ☐ minFznorm
- ☑ max |Vtot| ← → **TOTAL SHEAR**
- ☑ max|Fxy| ← → **AXIAL + SINGLE SHEAR**
- ☑ max|Fxz|
- ☑ max|Fxyz| ← → **AXIAL + BOTH SHEARS**
- ☑ max|Mx| ← → **TORSION**
- ☑ max|My| ← → **MINOR BENDING**
- ☐ maxMy
- ☐ minMy
- ☑ max|Mz| ← → **MAJOR BENDING**
- ☐ maxMz
- ☐ minMz
- ☑ max|Mtot| ← → **MINOR + MAJOR BENDING**
- ☑ max conn comp
- ☑ max bolt tens ← → **END PLATE CONNETION EFFECTS ESTIOMATION**
- ☑ max bolt shear

Staad member axias system

Vtot — Fy, Fz

Fxy — Fy, Fx

Fxz — Fz, Fx

Fxyz — Fy, Fz, Fx

Mtot — My, Mz

max connection compression(Fx, My, Mz)

max bolt tension (Fx, My, Mz)

max bolt shear (Mx, Fy, Fz)

1 ft

Force sign convention

Side view

member i/j

(+) is member compression
(-) is member tension

(+) is down force (against to local Y)
(-) is uplift force

Top view

member i/j

(+) is shear force against to local Z
(-) is opposite

4. Generating output report

Screenshot of the soco 0.2.1 application window. An arrow points to the "GET REPORT" button with the annotation "click 'GET REPORT'".

Additional features

Plots

plots that visualize forces for listed ends
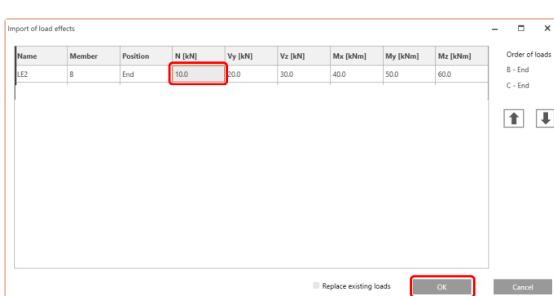
## Transfering force to IdeaStatica

copy - paste into IdeaStatica

IdeaStatica input

Copy area as show above.
In IDEA StatiCa Connection, select the XLS Import command from the ribbon.
Finally, select the indicated cell below and Paste (Ctrl+V) the values.

"One branch loaded" model example

Note. This procedure is assumed to be used for IdeaStatic connection model with only one branch loaded.

Showing Staad model file name in report

optional Staad model name - if specified it will be shown at the top of report

Highlighting members and nodes in Staad


'show in staad' highlights members and nodes in Staad so you can see what members and ends are listed in Soco (make sure you have only one Staad instance open)

By default consider to insert Soco output in your report in the way shown below.

10.1 SHS200x200x10 beam to SHS200x200x10 post connection

calc report section title

show this snip from Staad, highlight beams and nodes that have been considered (you can use "show in staad" feature to highlight)

specify Staad Envelope or range of Load Cases that have be used to get Soco output
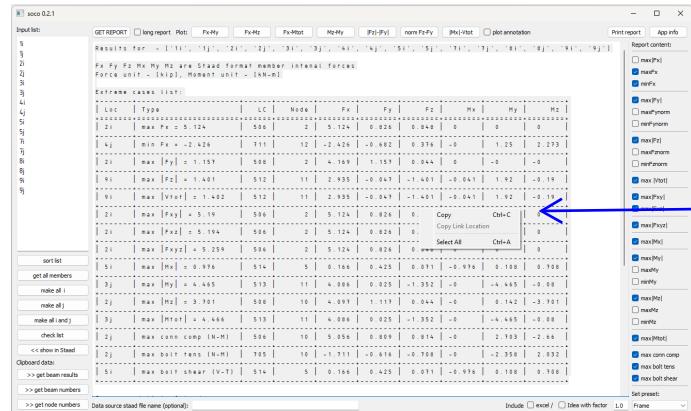
Factored internal forces (based on Staad "Beam End Forces" output data table for Envelope 3):

Results for – ['5i', '15i', '17i', '20j', '24j', '25j', '35j', '39j', '43j', '51j', '53i', '55j']

Fx Fy Fz Mx My Mz are Staad format member internal forces
Force unit – [kip], Moment unit – [kN-m]

Extreme cases list:

Loc	Type	LC	Node	Fx	Fy	Fz	Mx	My	Mz
39j	max Fx = 0.551	502	14	0.551	-1.529	-0.327	1.808	-0.065	4.126
43j	min Fx = -0.41	509	16	-0.41	0.783	-0.016	-0.001	0.01	-2.47
24j	max |Fy| = 2.174	506	10	-0.061	2.174	-0.033	3.958	0.202	4.47
39j	max |Fz| = 0.493	514	14	0.306	-1.524	-0.493	3.8	-0.117	2.198
24j	max |Vtot| = 2.174	506	10	-0.061	-2.174	-0.033	3.958	0.202	4.47
24j	max |Fxy| = 2.175	506	10	-0.06	-2.174	-0.033	3.958	0.202	4.47
39j	max |Fxz| = 0.627	506	14	0.496	-1.626	0.383	3.157	-0.092	3.359
24j	max |Fxyz| = 2.175	506	10	-0.061	-2.174	-0.033	3.958	0.202	4.47
24j	max |Mx| = 4.917	514	10	-0.187	-1.972	-0.122	4.917	0.137	2.731
35j	max |My| = 0.817	509	15	-0.136	-1.016	-0.29	-0.128	0.817	2.694
24j	max |Mz| = 5.623	502	10	0.06	-2.068	0.049	2.155	0.218	5.623
24j	max |Mtot| = 5.627	502	10	0.06	-2.068	0.049	2.155	0.218	5.623
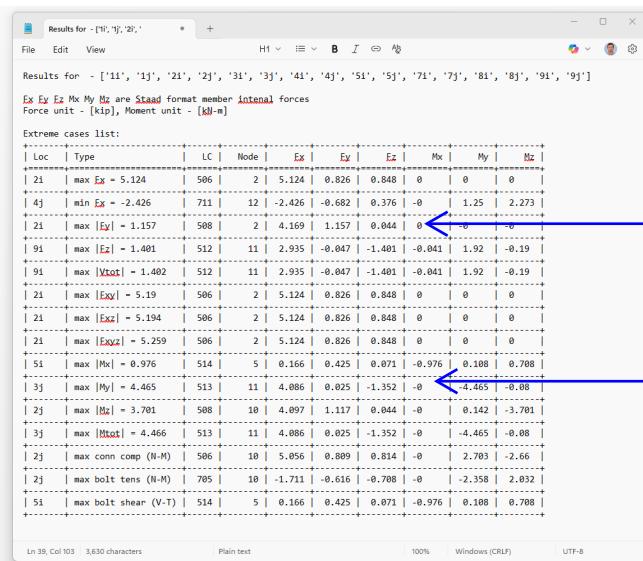
paste this as snip from soco

Getting Soco report as text in your Word calculation report
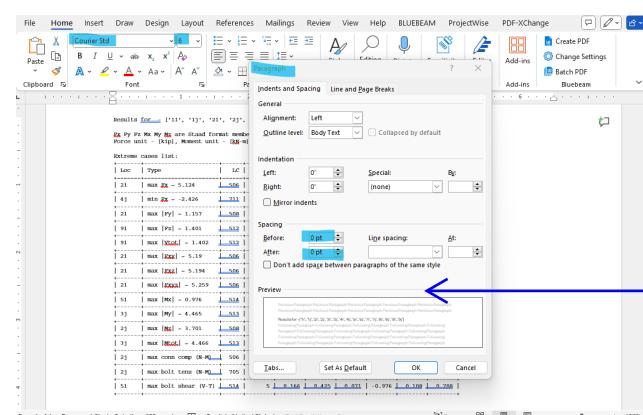
Instead of snip you can place Soco output as text in your calc report. As the Soco output text tables require monospace font follow the procedure shown below. (For some reason directly copy from Soco and paste into Word may not works correctly so Notepad stage is required)

1. select content, right click and "Copy"

2. Go to Notepad, right click and "Paste"

3. again select content, right click and "Copy"

4. Go to Word, right click and "Paste". Then set font size 6, font Courier Std, and Paragraph spacing 0.

- END OF TUTORIAL -

Project website:
https://github.com/lukaszlaba/soco

Download latest version from:
https://github.com/lukaszlaba/soco/releases