Stålbyggnadsdagen 2024-11-07

Agenda

- Kort om mig och VBK
- Om projektet
- Tornets stomme och verkningssätt
- Stålkonstruktioner i Karlatornet

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Nedre utriggare

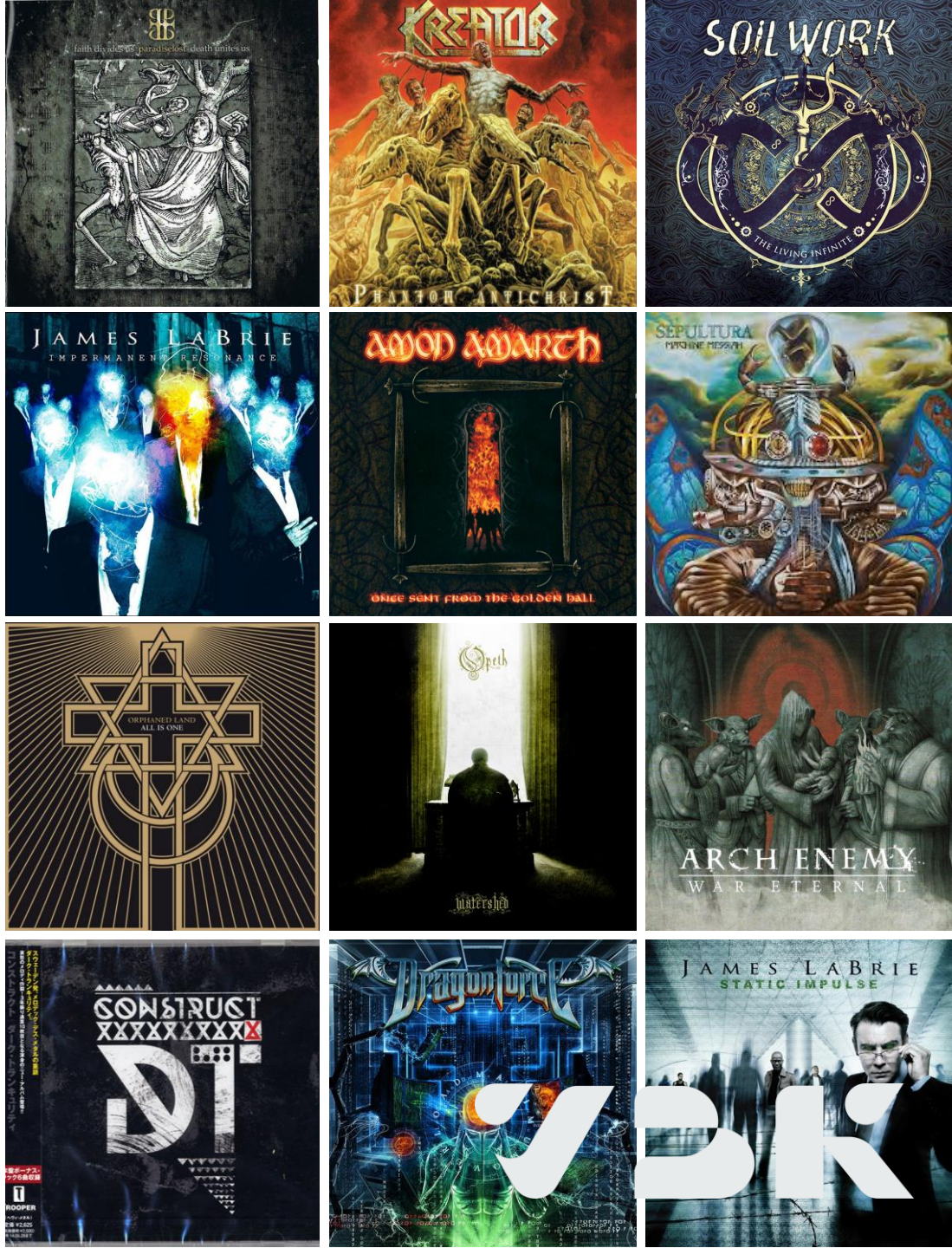
Hängpelare

Övre utriggare

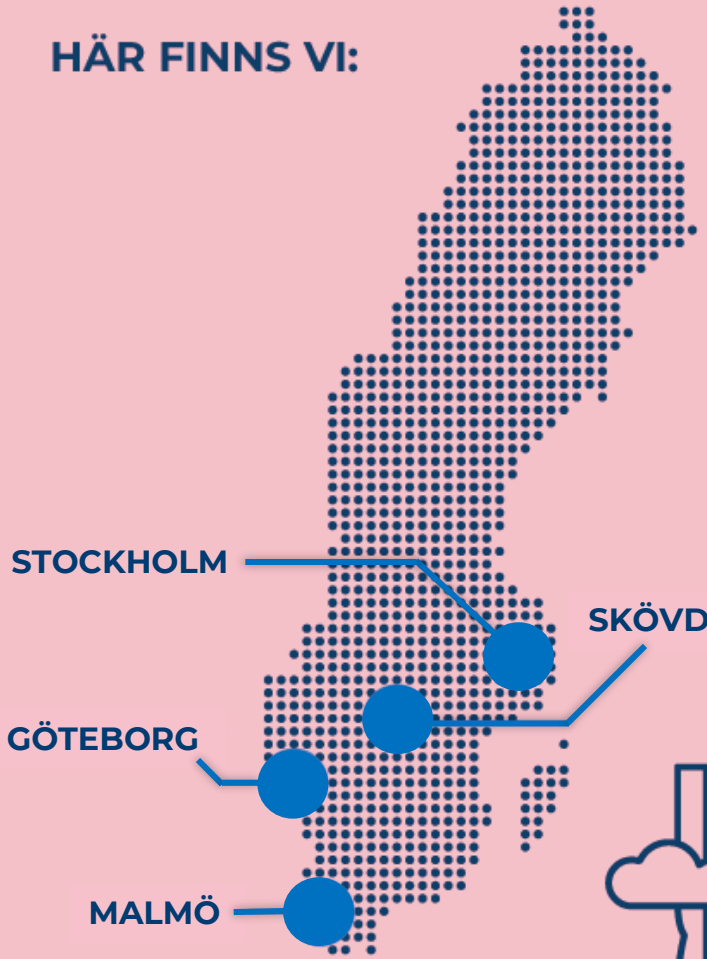
Kronan

Kort om mig

- Johan Örnborg
- Civilingenjör inom byggnadskonstruktion
- Arbetar som uppdragsledare och teknisk specialist på VBK
- Har tidigare arbetat som ljudtekniker/musikproducent



HÄR FINNS VI:




SERNEK
Stena Line

VBKs uppdrag

Huvud K Konstruktionsansvar för hela byggnaden exkl. bjälklagen. Stort samordningsansvar.

Bygghandling 1100 ritningar

Dimensionering av temporära konstruktioner

Byggplatsuppföljning

Byggnadsfakta

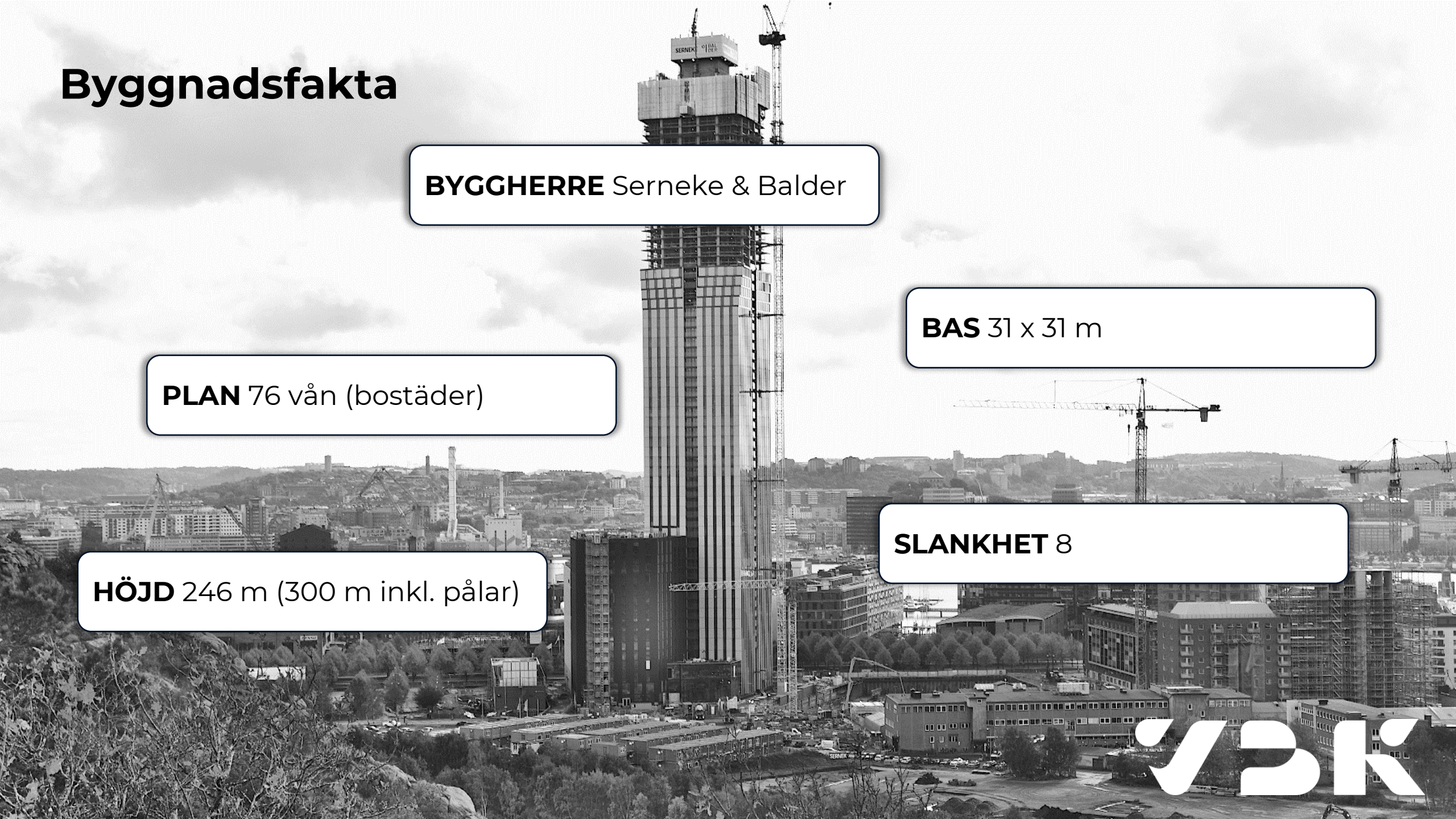
BYGGHERRE Serneke & Balder

BAS 31 x 31 m

PLAN 76 vån (bostäder)

SLANKHET 8

HÖJD 246 m (300 m inkl. pålar)



Betong

Totalt 115 000 ton

Hållfasthet C40/50 – C70/85

Klimatförbättrade recept

Kravställd E-modul

Armering >1 000 000 järn

Stål

Totalt drygt 500 ton

Kvalitet upp till S460 NL

50% av totala stålmängden utgörs av stålplåtar

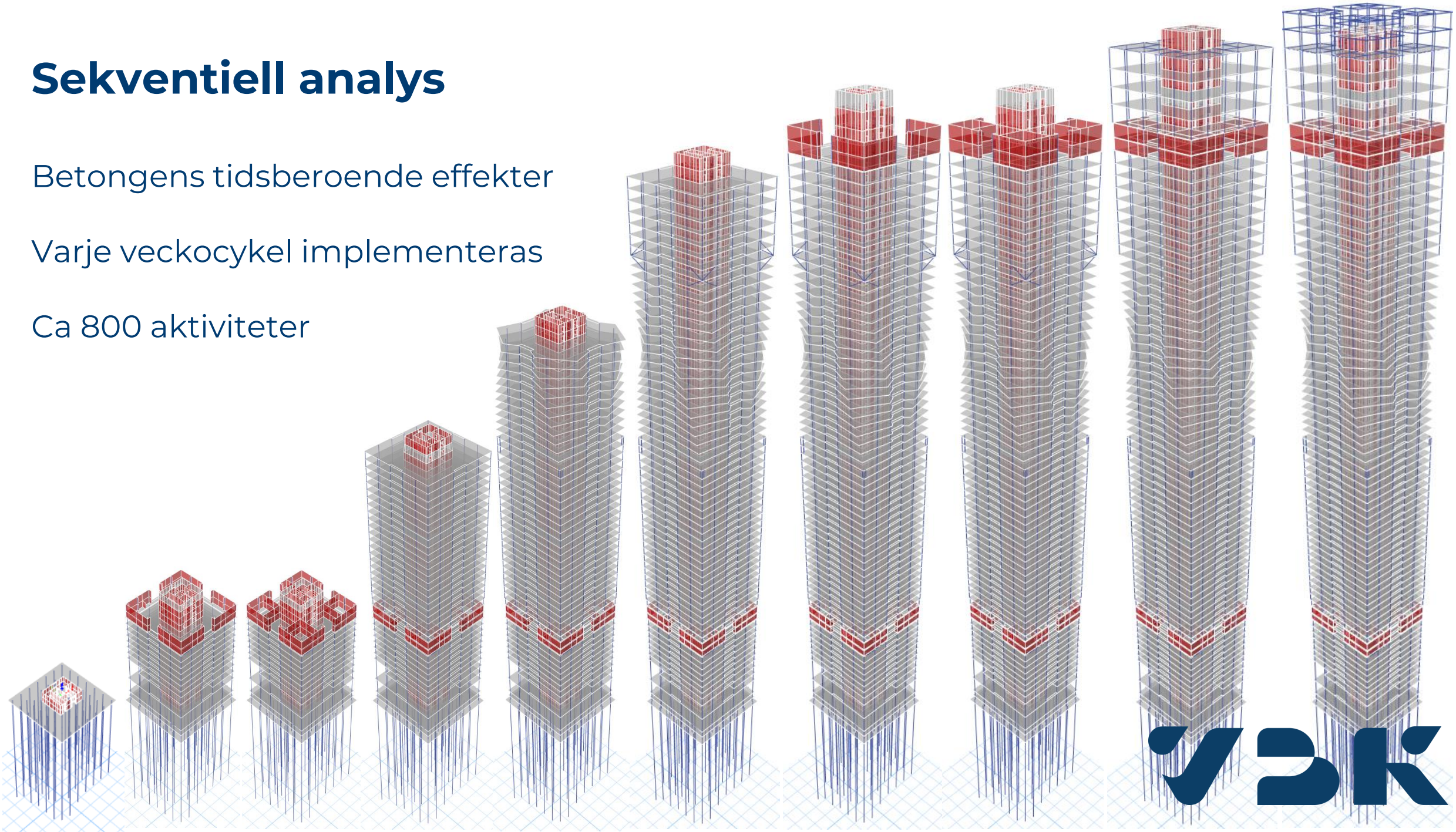
Arbetsflöde

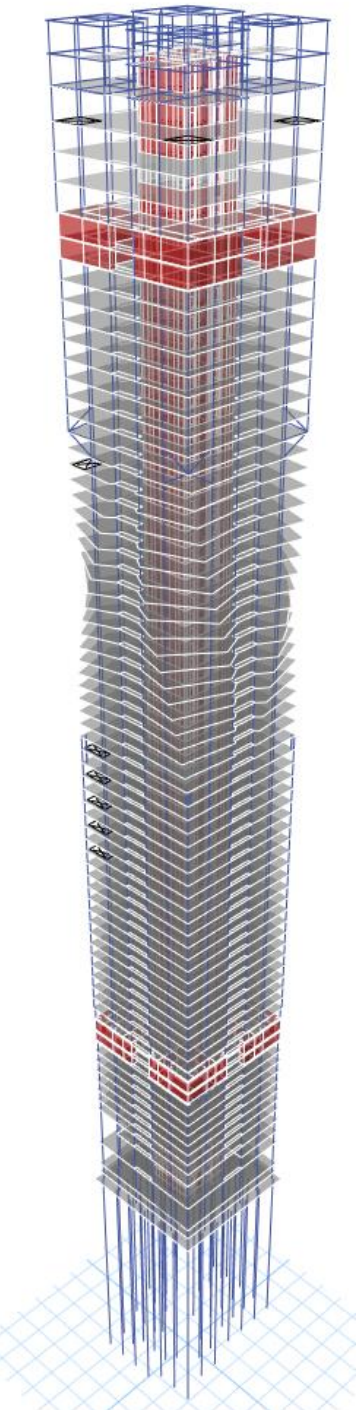
Sekventiell analys

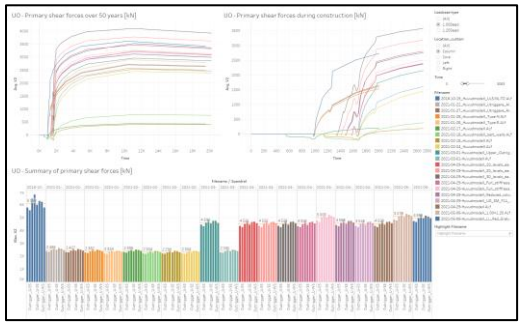
Betongens tidsberoende effekter

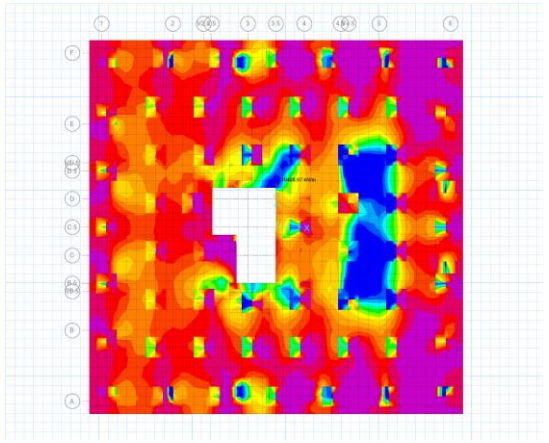
Varje veckocykel implementeras

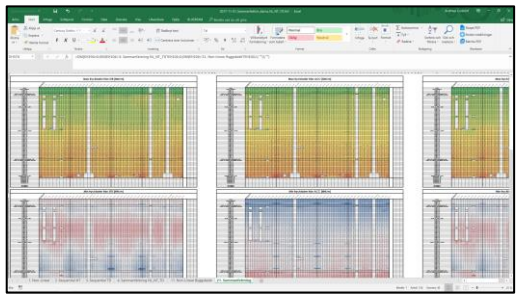
Ca 800 aktiviteter

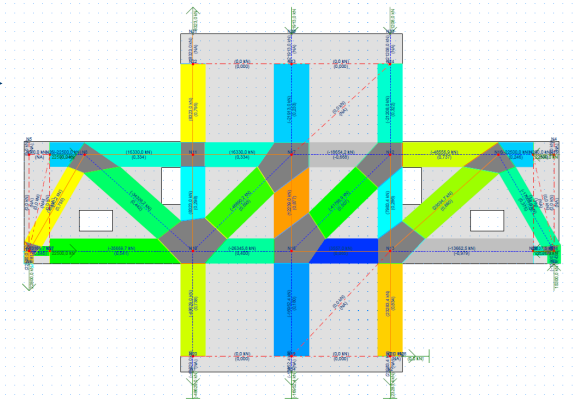


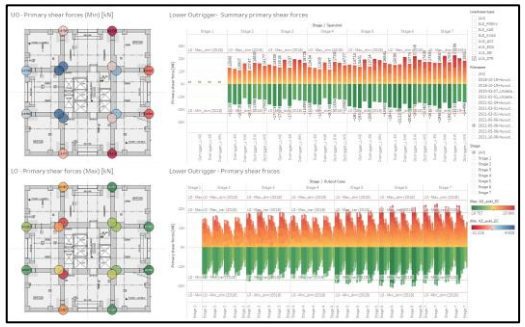


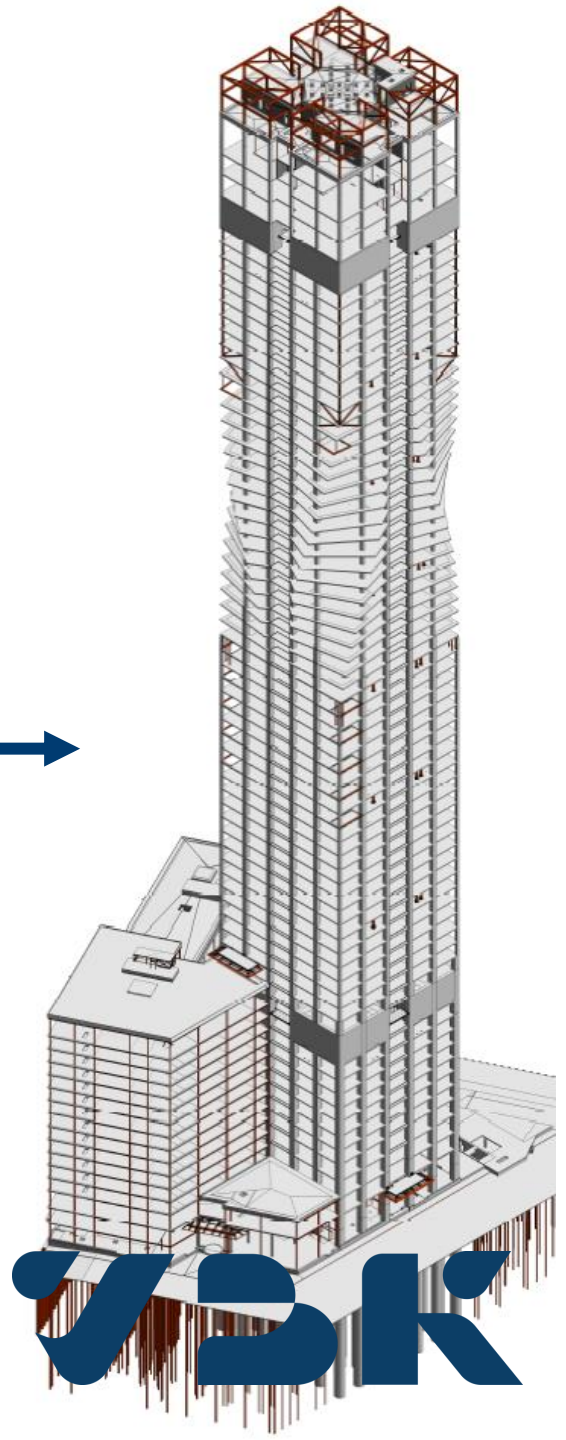






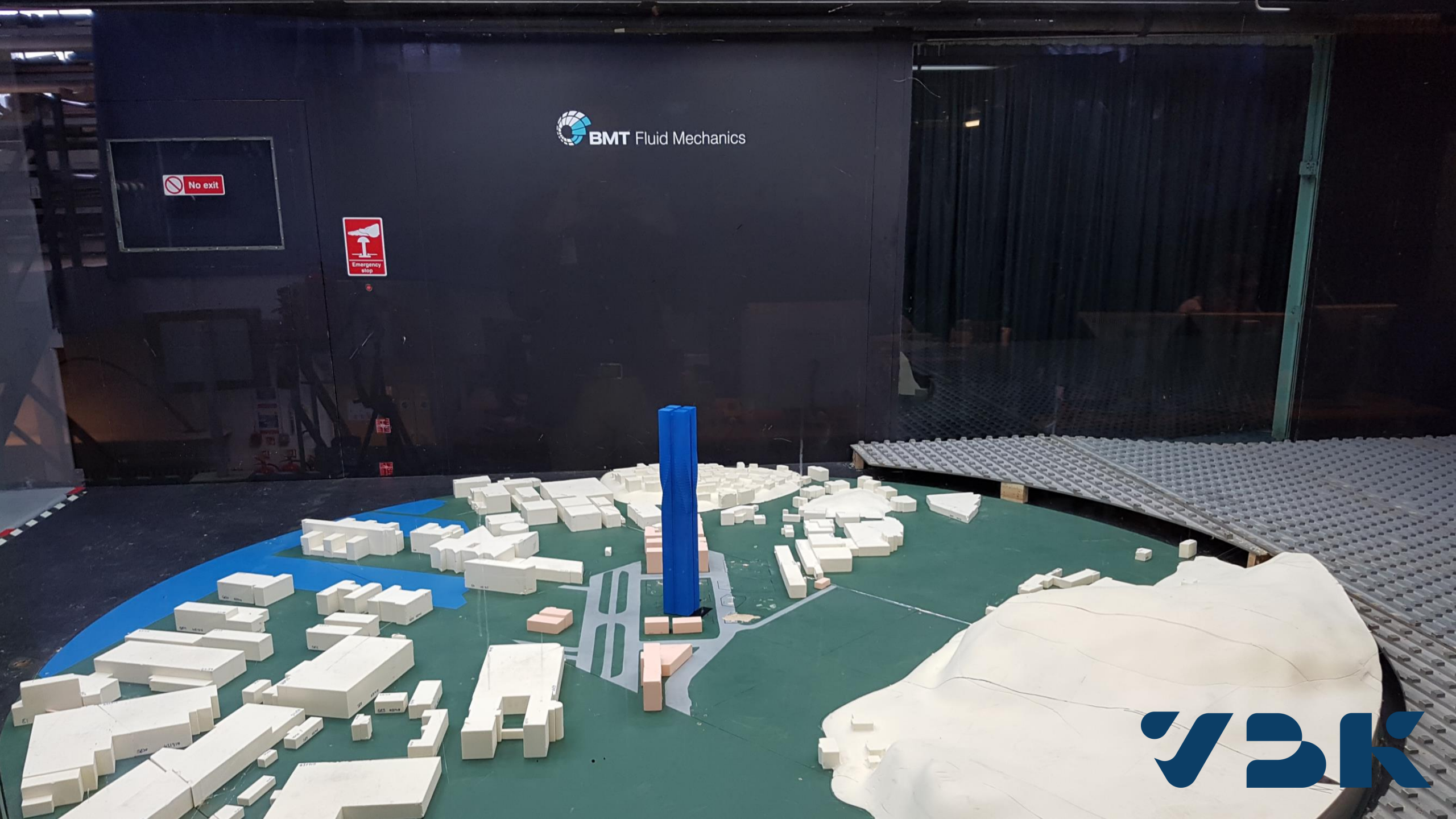


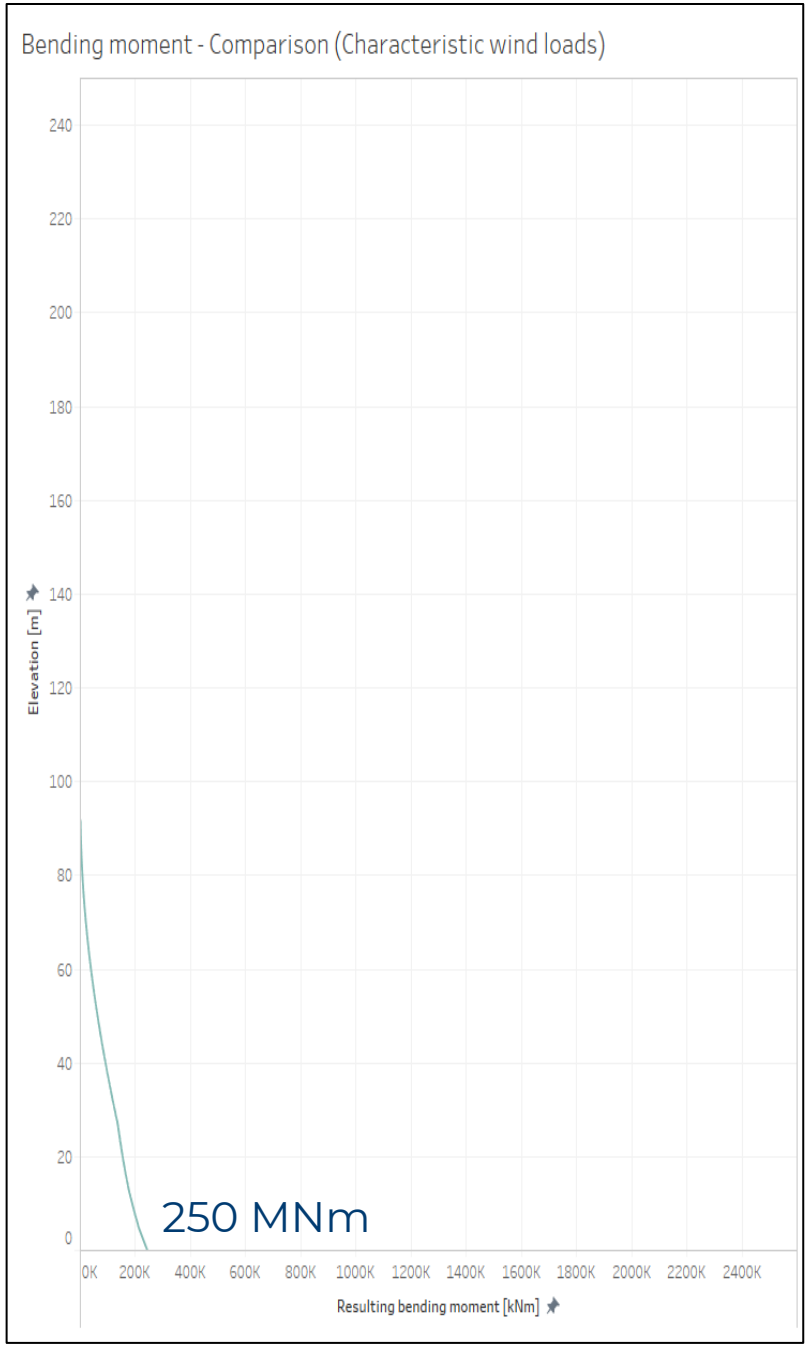


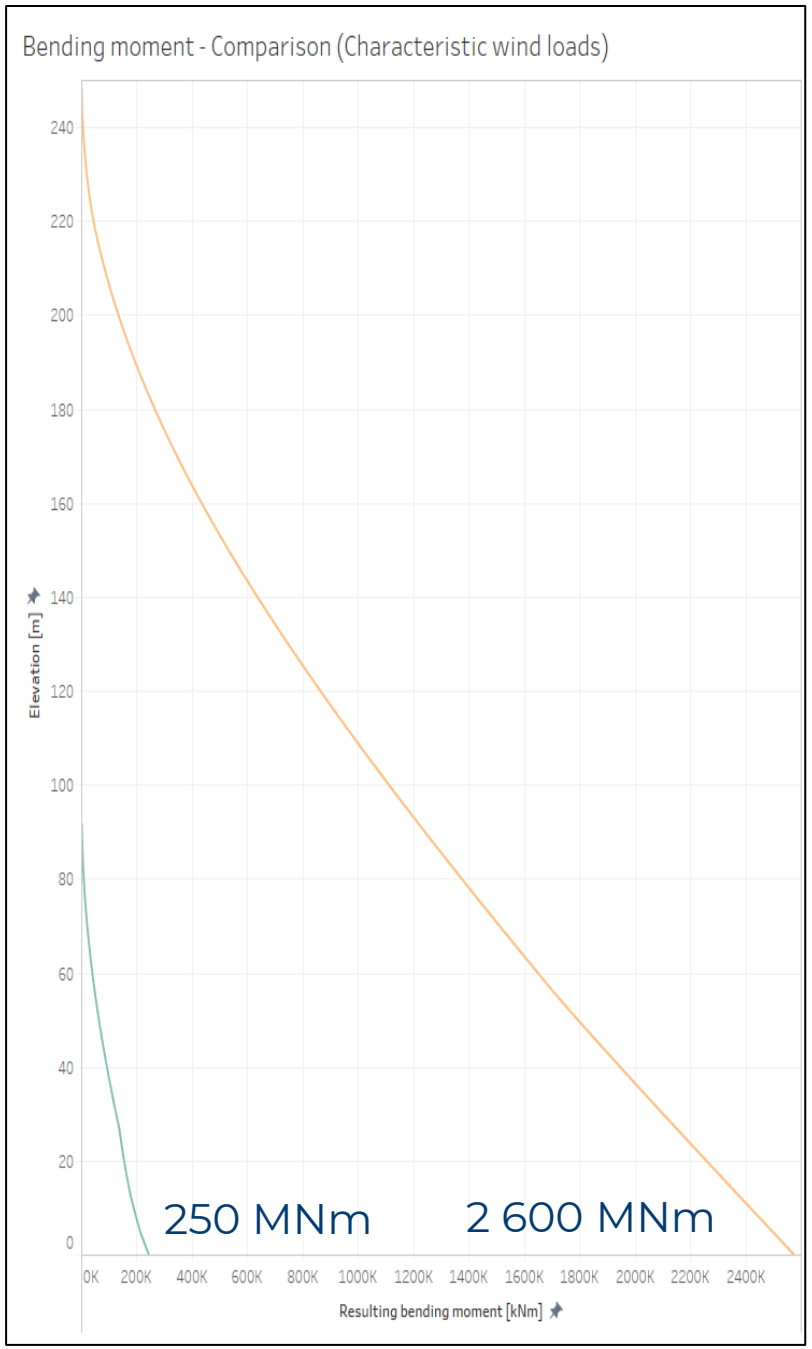


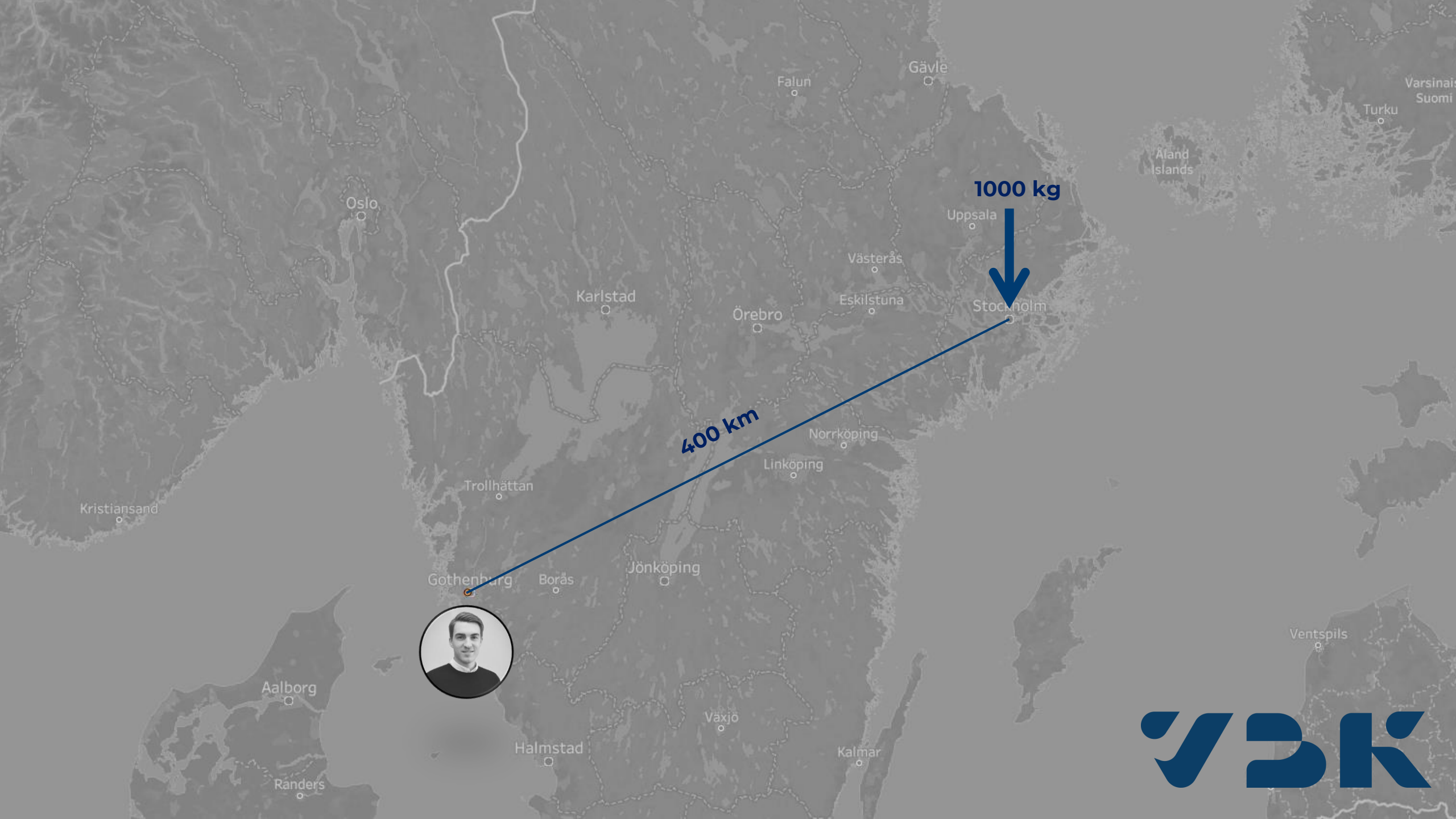
Stål i Karlatornet

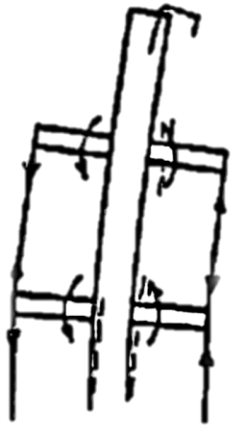
Nedre utriggare

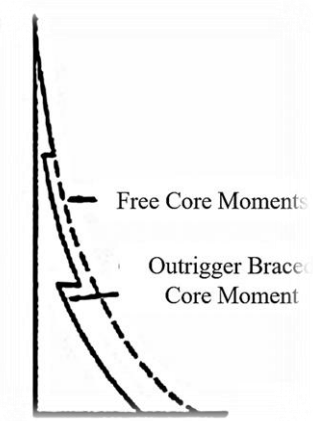

BMT Fluid Mechanics
No exit
Emergency stop

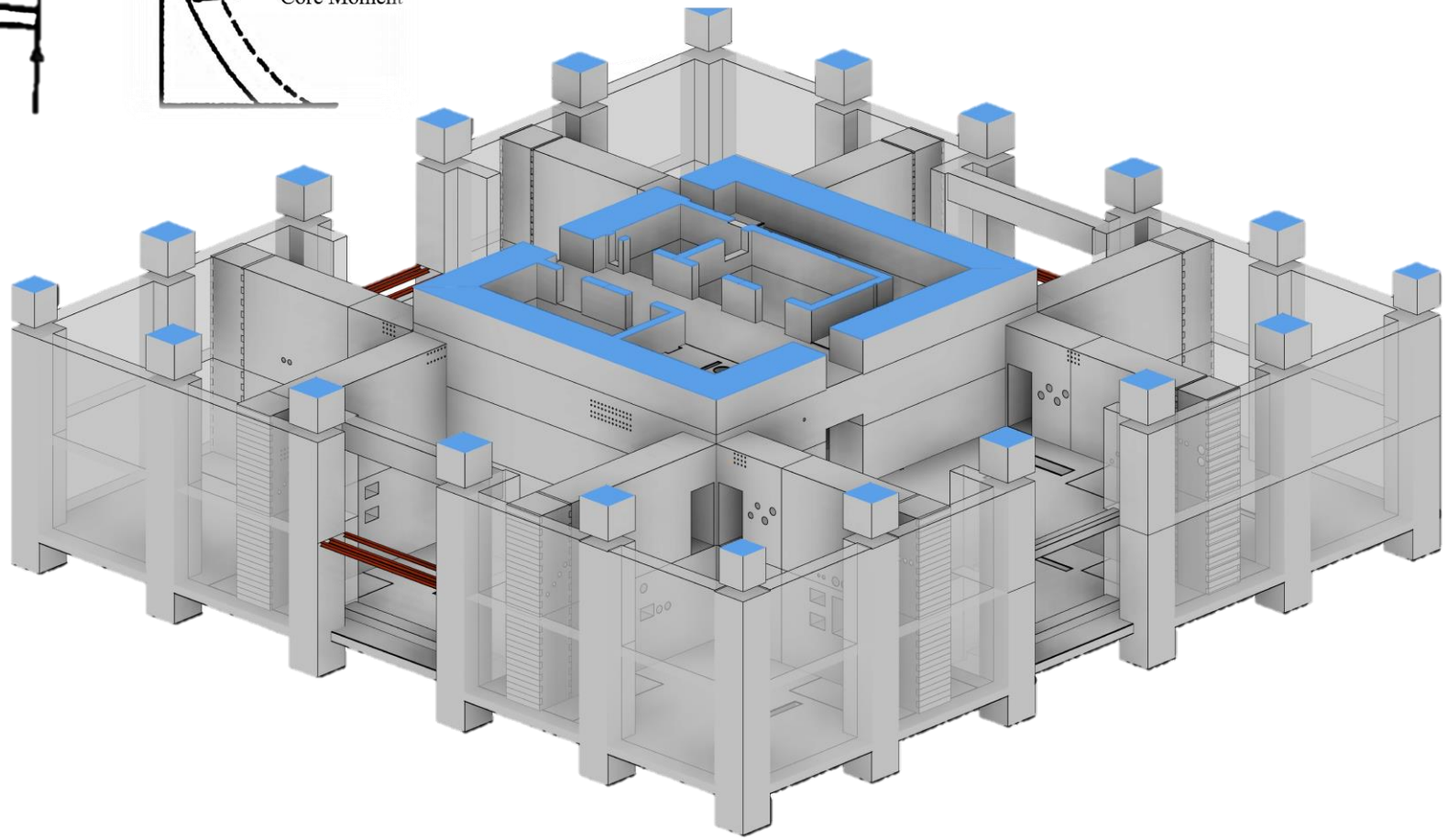

Bending moment - Comparison (Characteristic wind loads)
240
220
200
180
160
140
120
100
80
60
40
20
0
Elevation [m]
250 MNm
0K
200K
400K
600K
800K
1000K
1200K
1400K
1600K
1800K
2000K
2200K
2400K
Resulting bending moment [kNm]

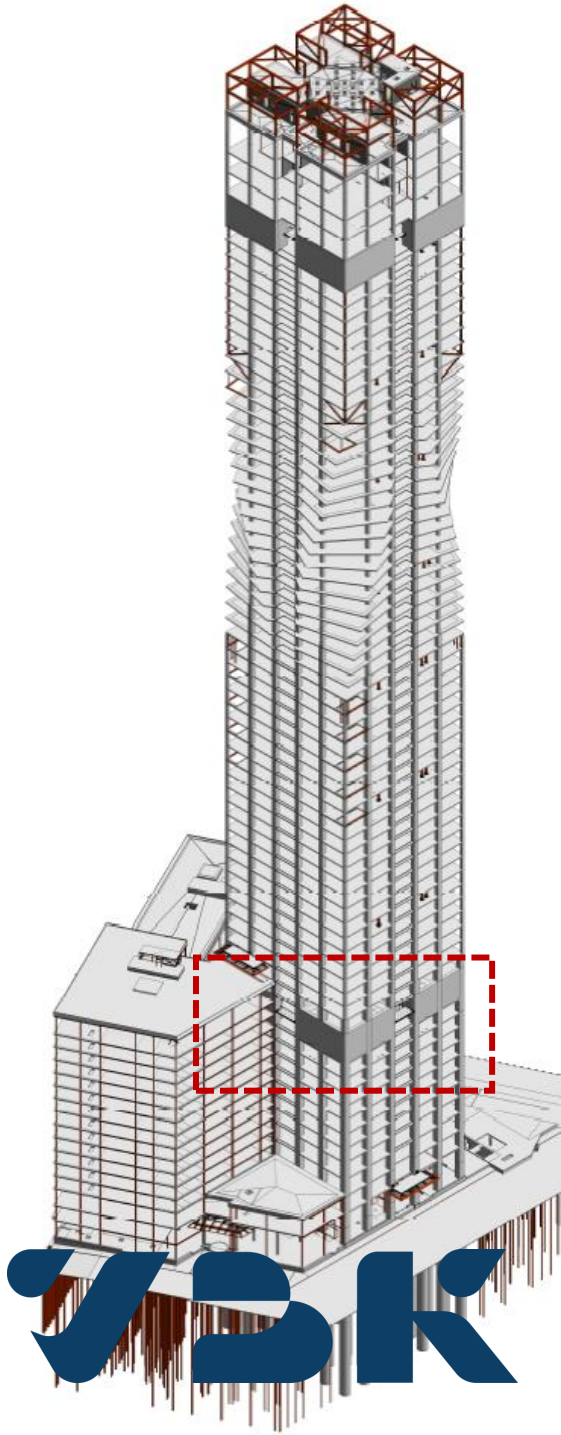

Bending moment - Comparison (Characteristic wind loads)
Elevation [m]
240
220
200
180
160
140
120
100
80
60
40
20
0
250 MNm
2 600 MNm
0K
200K
400K
600K
800K
1000K
1200K
1400K
1600K
1800K
2000K
2200K
2400K
Resulting bending moment [kNm]

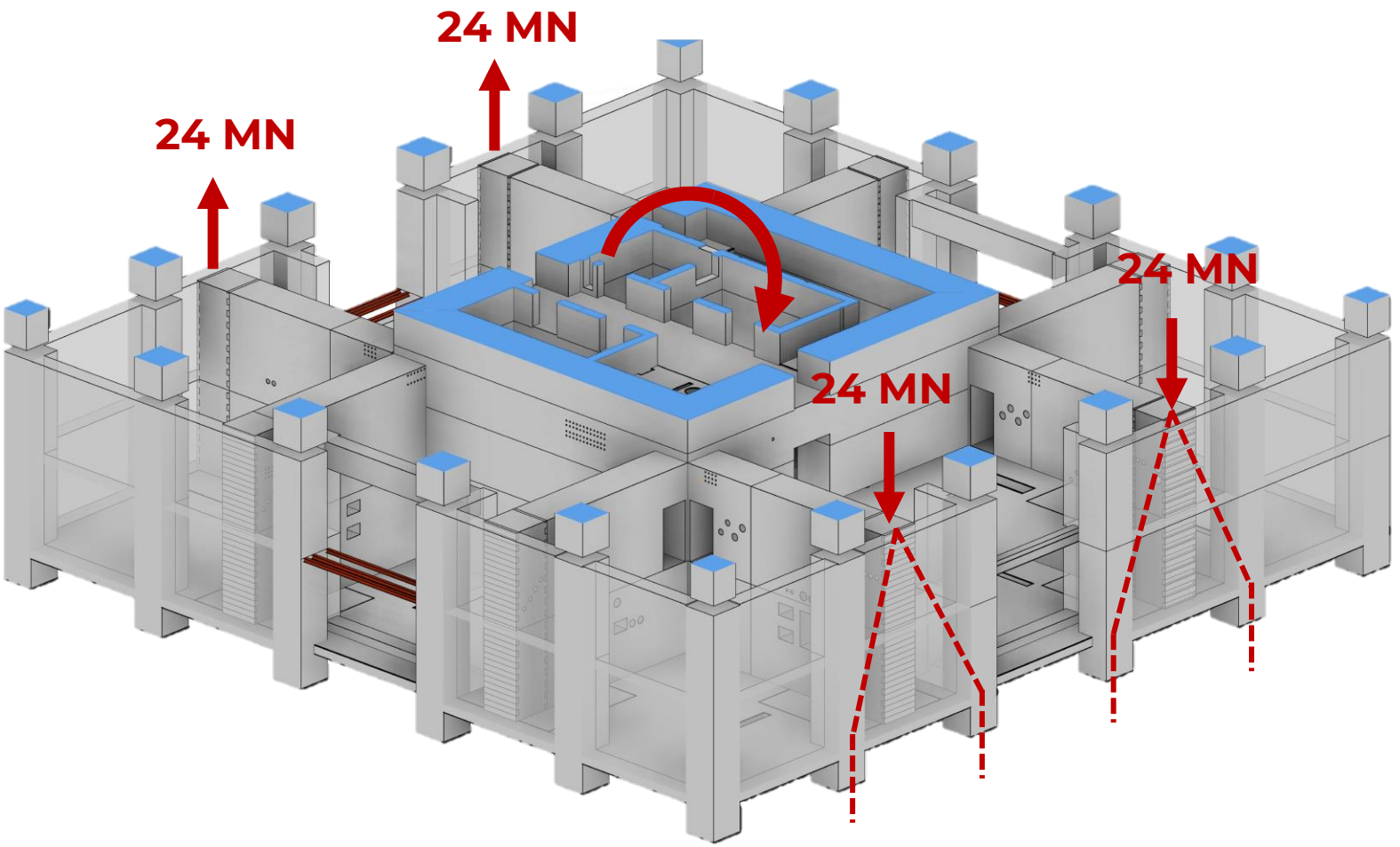

1000 kg
400 km
Gothenburg

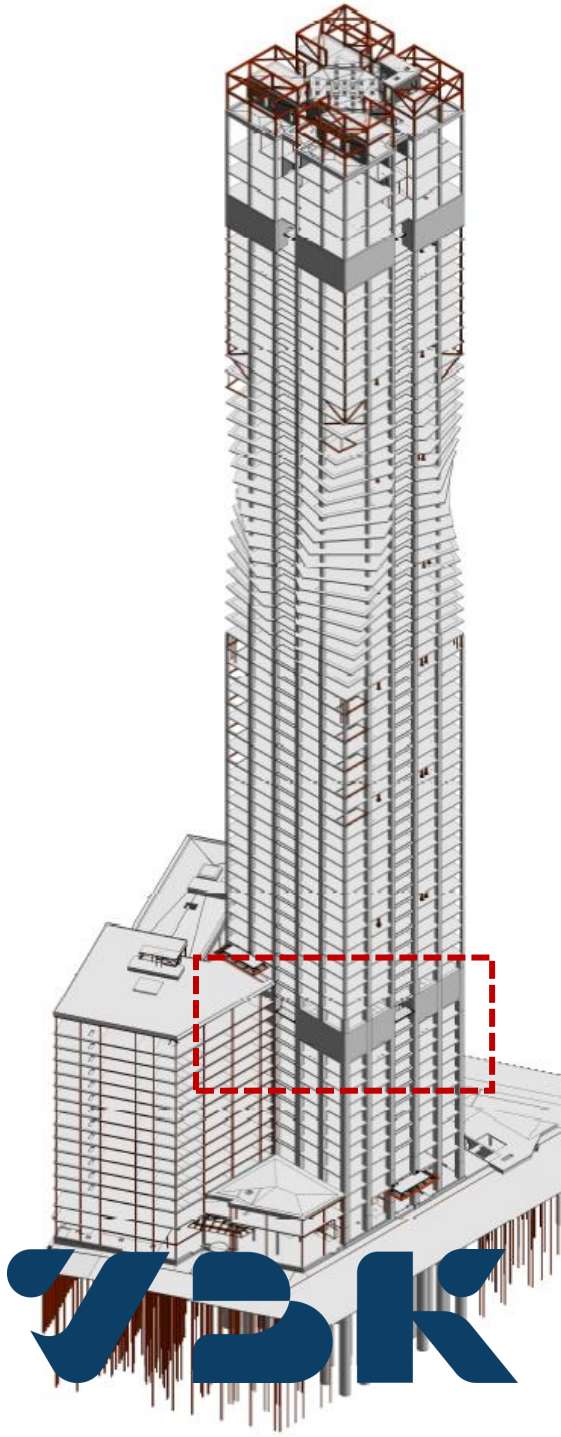



Free Core Moments
Outrigger Brace
Core Moment

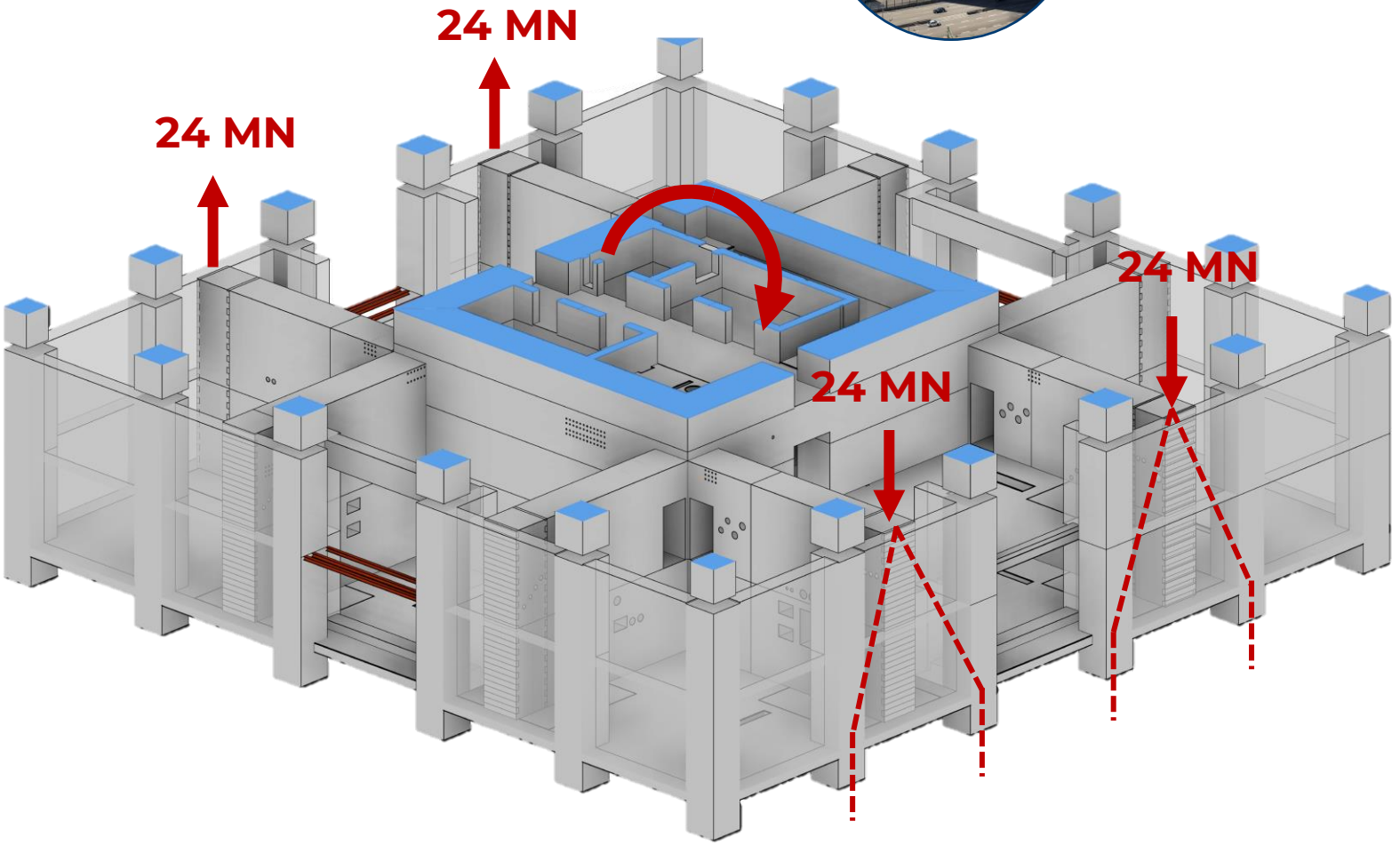


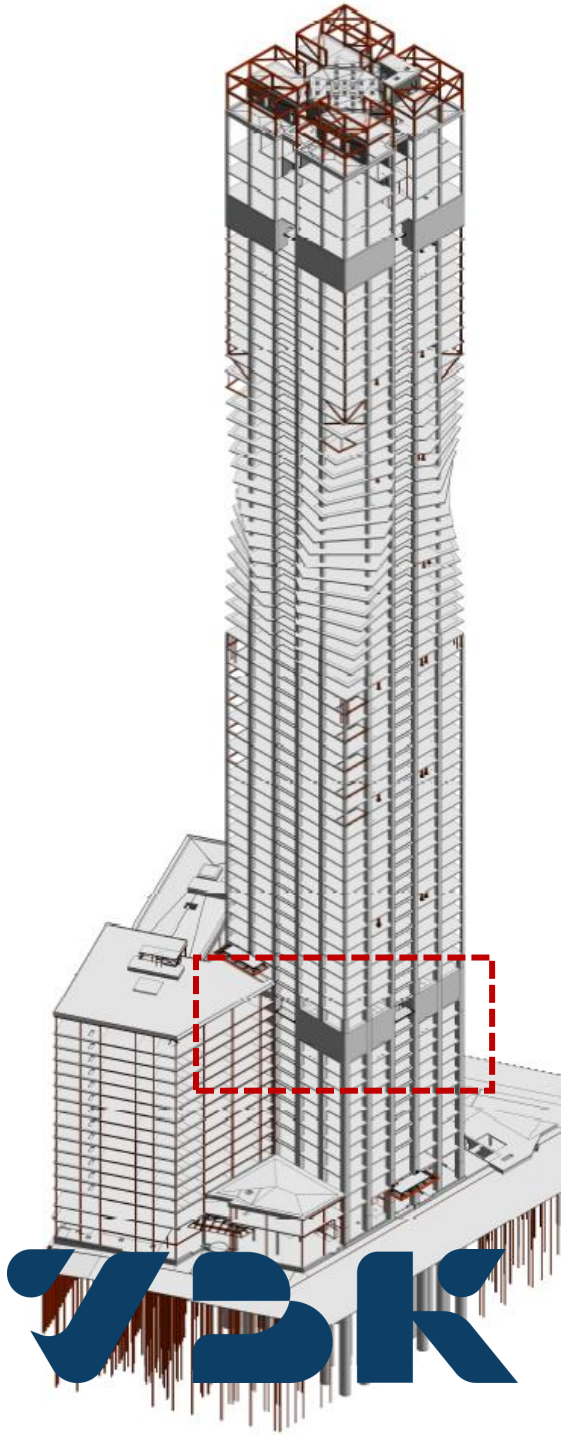


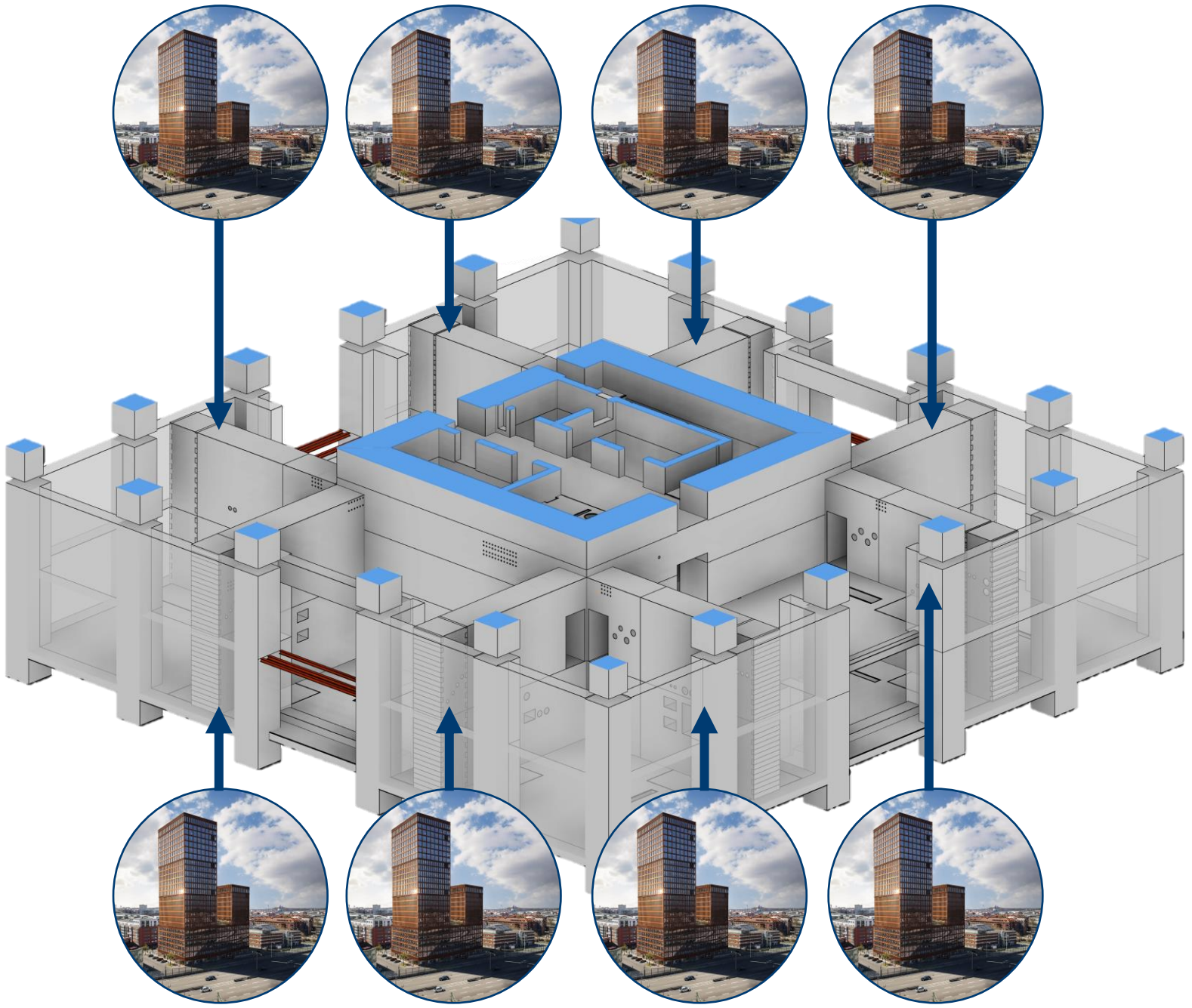

24 MN
24 MN
24 MN
24 MN

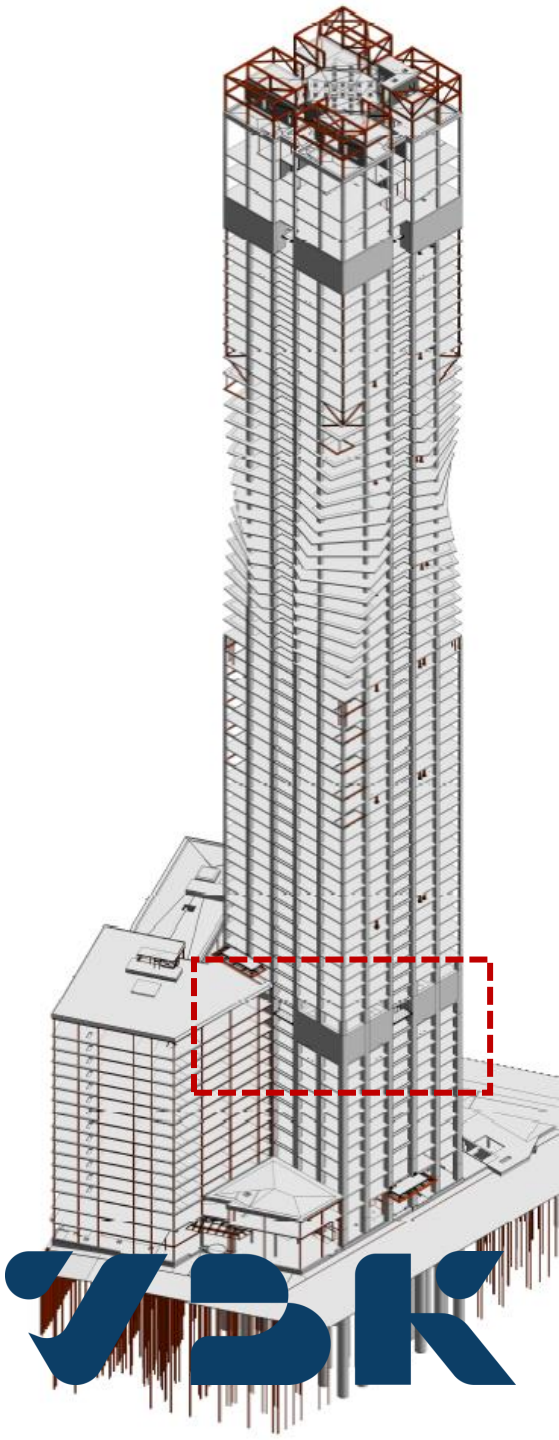


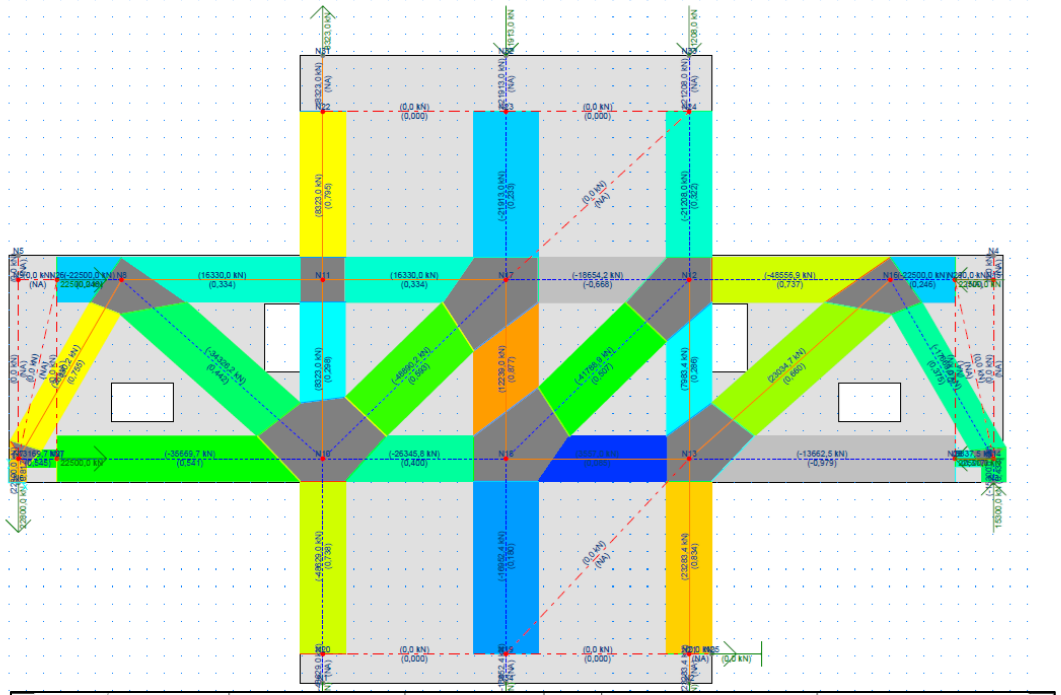
≈ 250 MNm

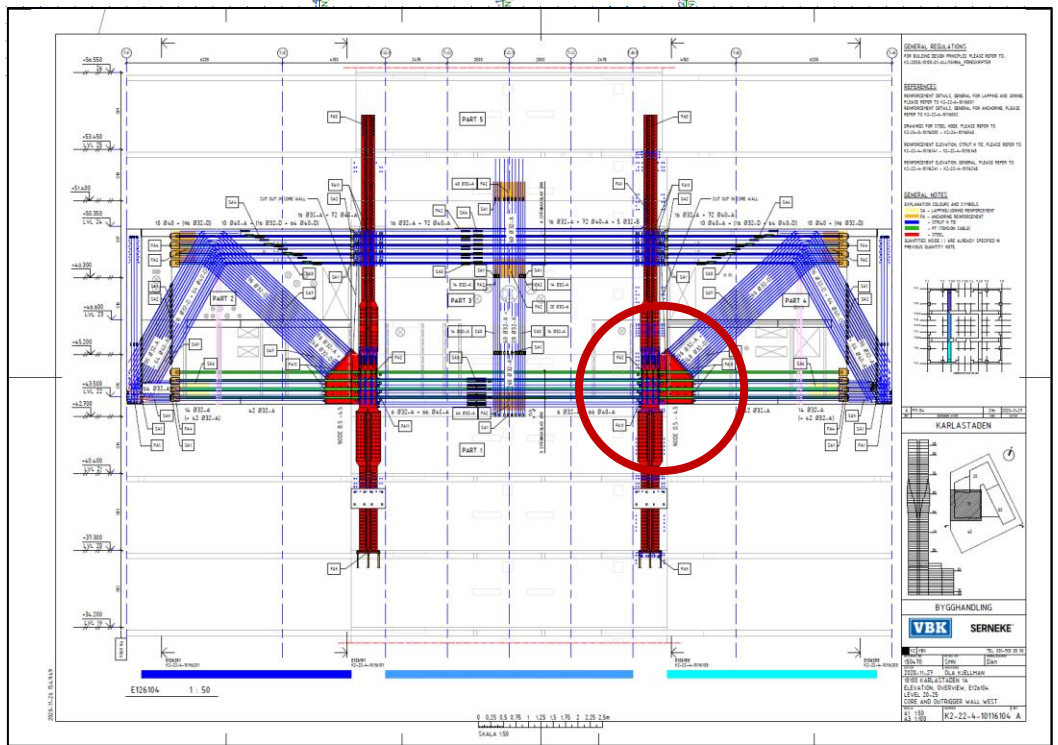


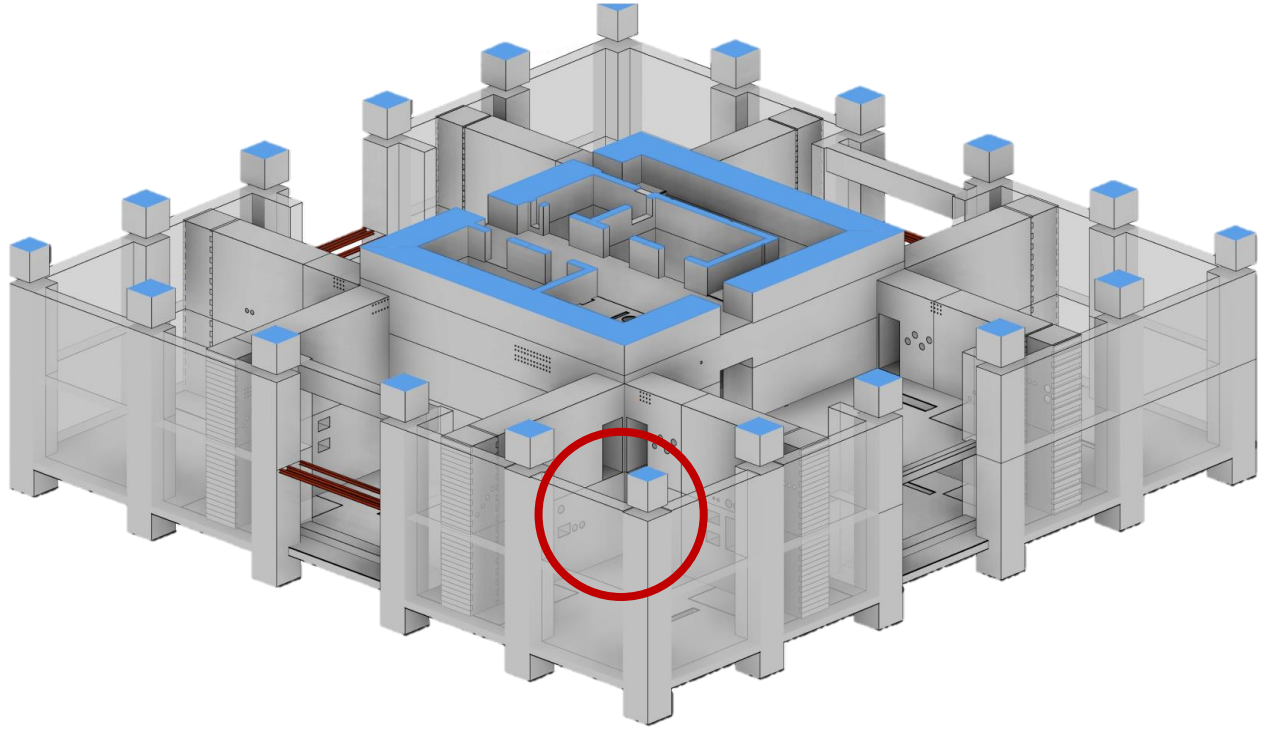


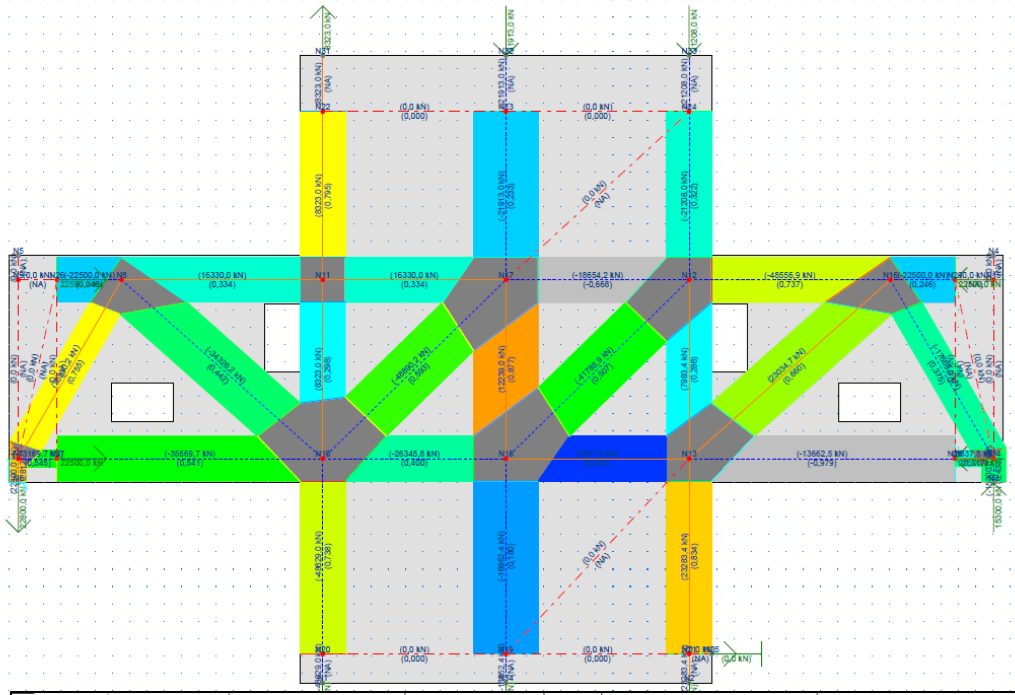


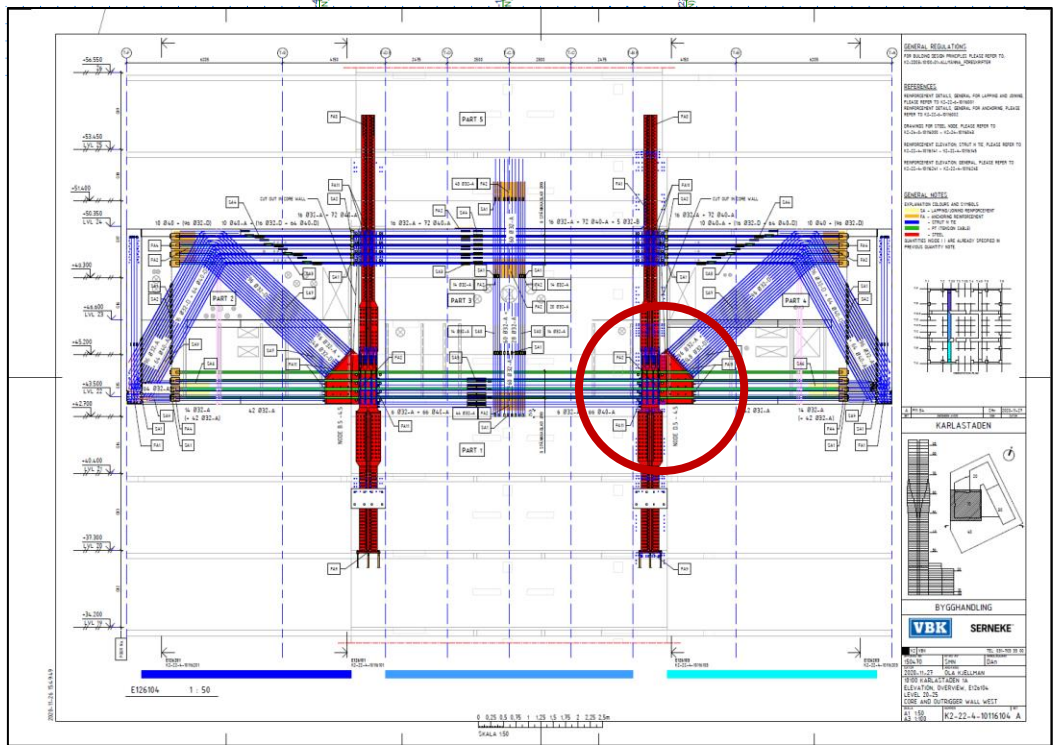


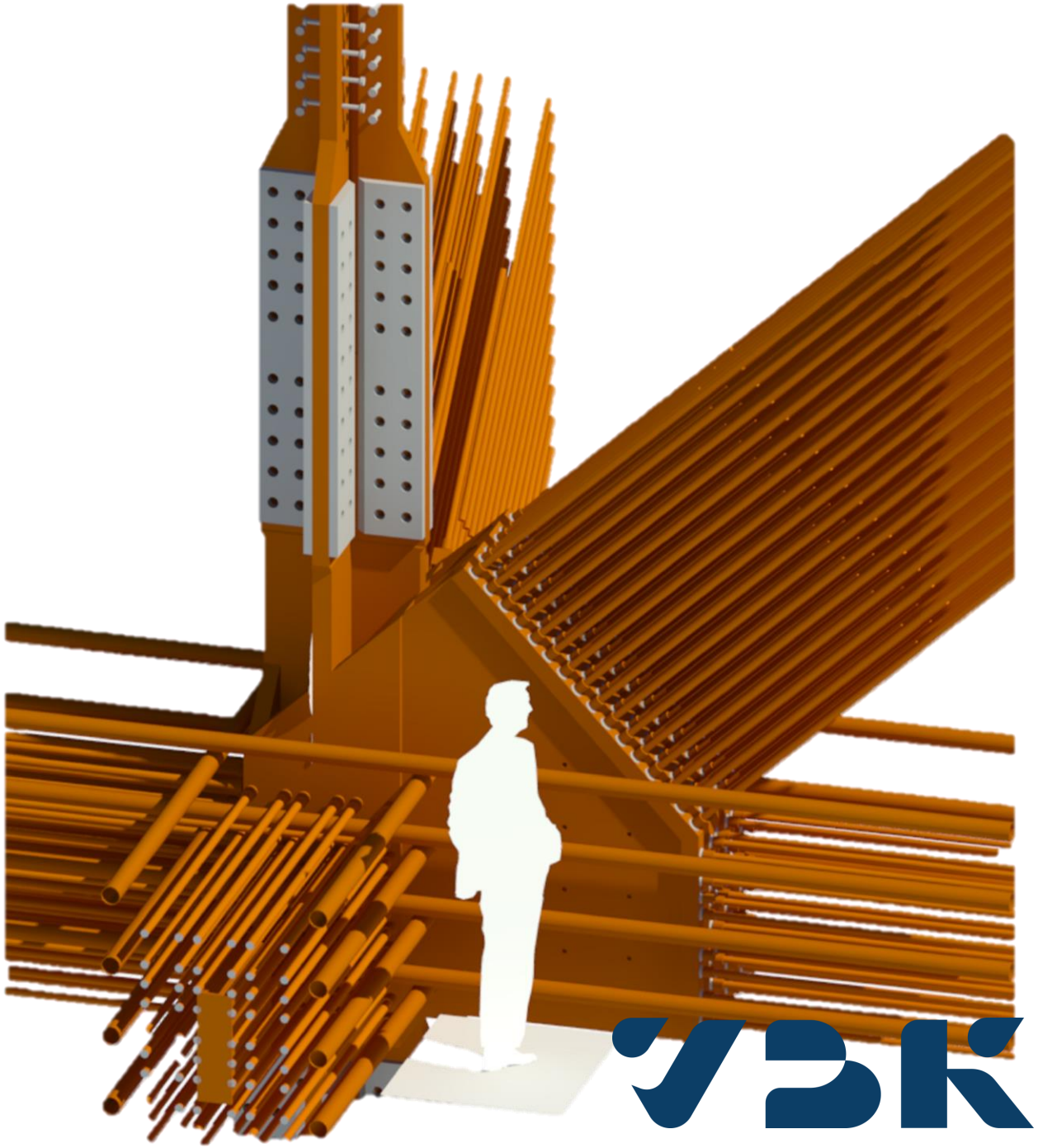



KARLASTADEN
BYGGHANDLING
VBK
SERNEKE

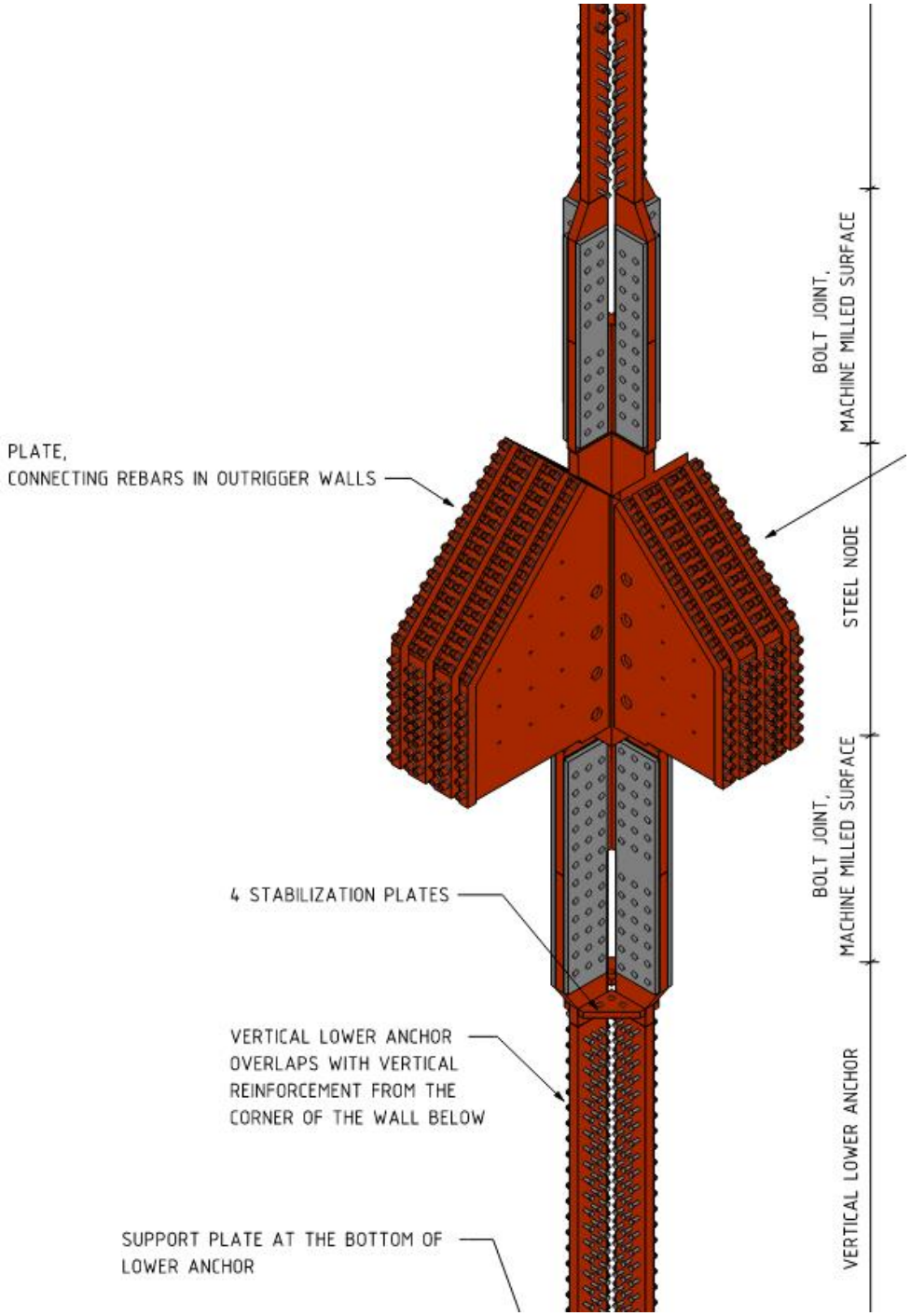


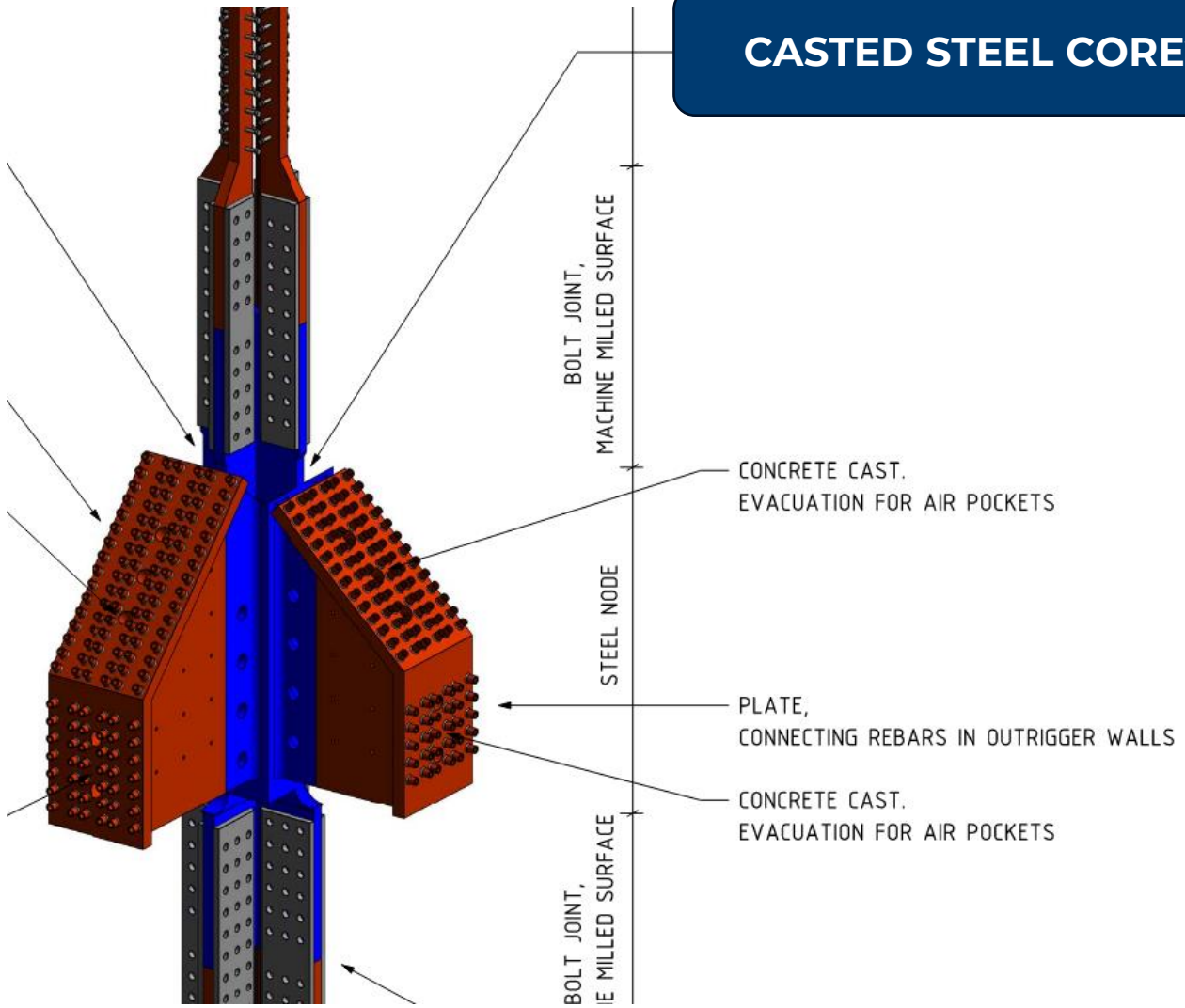


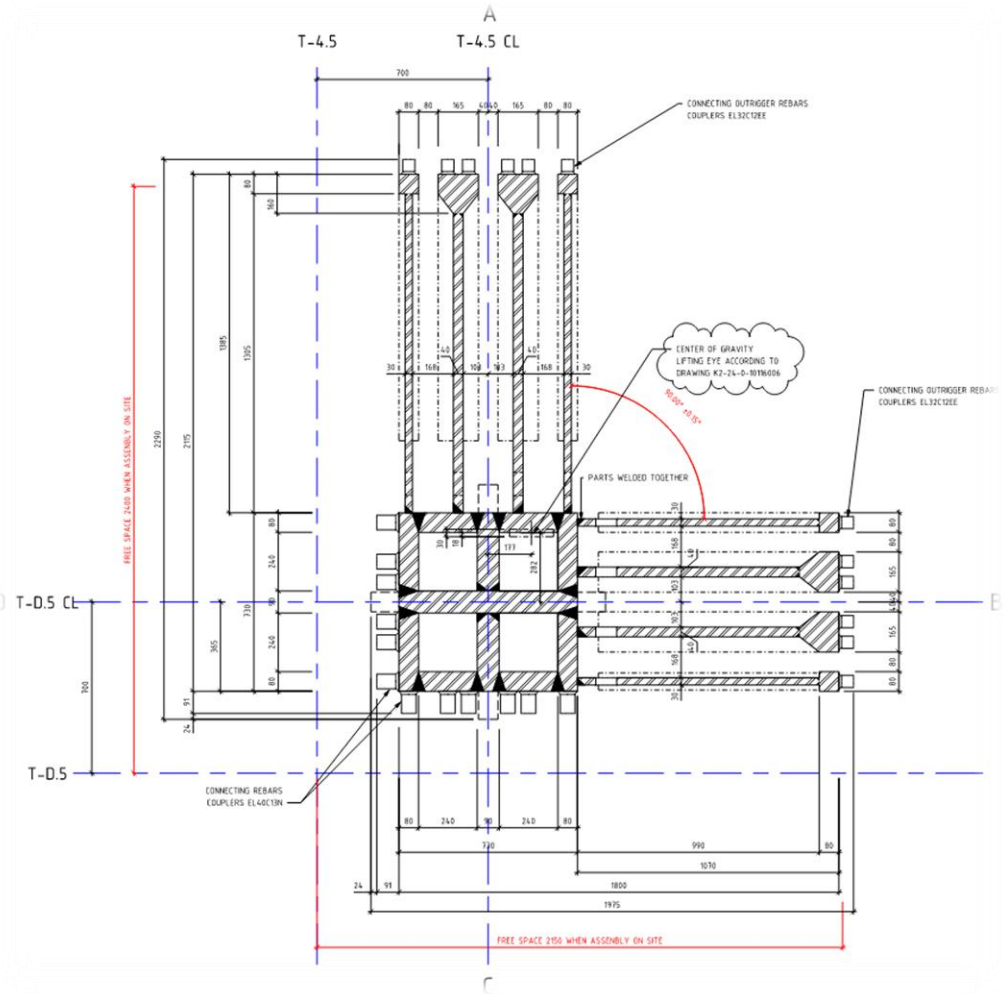

KARLSTADEN
BYGGHANDLING
VBK
SERNEKE

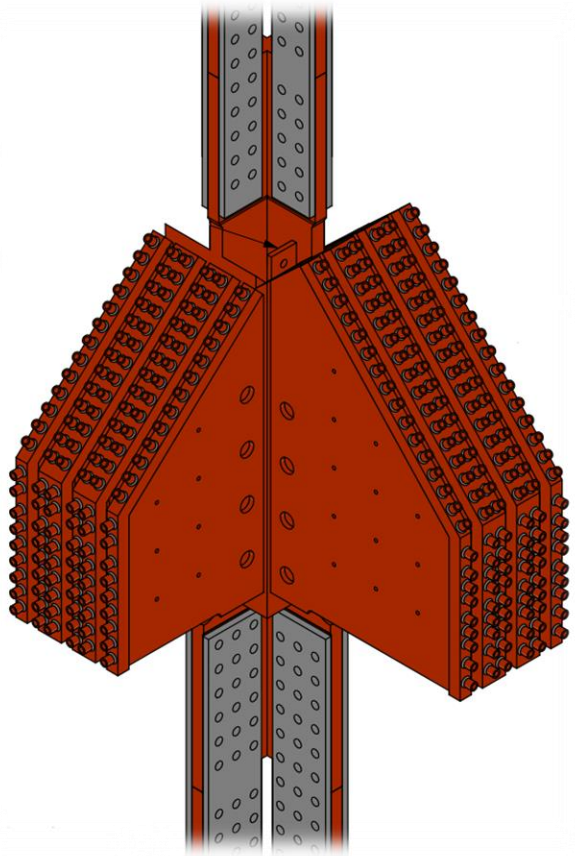


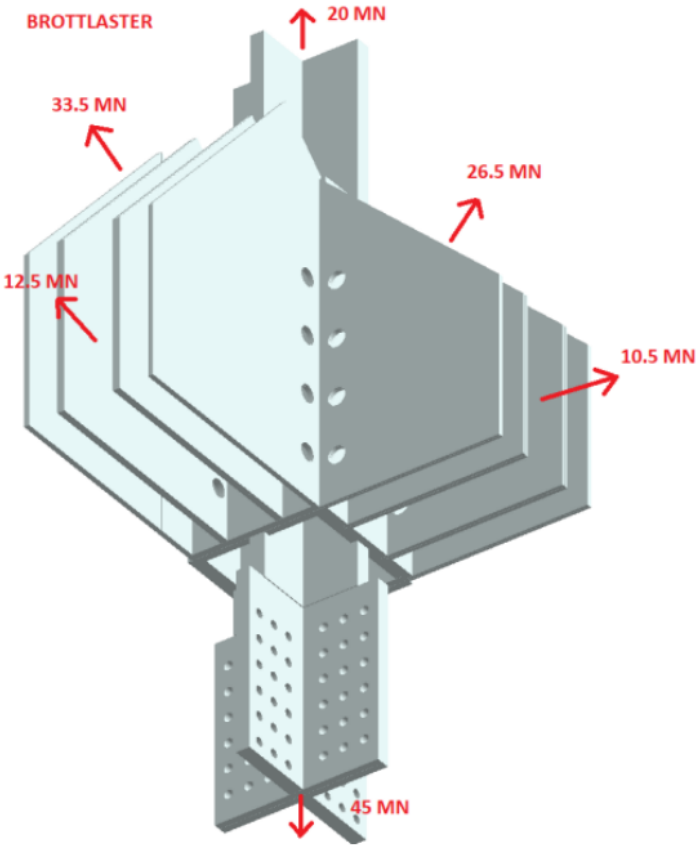
CASTED STEEL CORE?

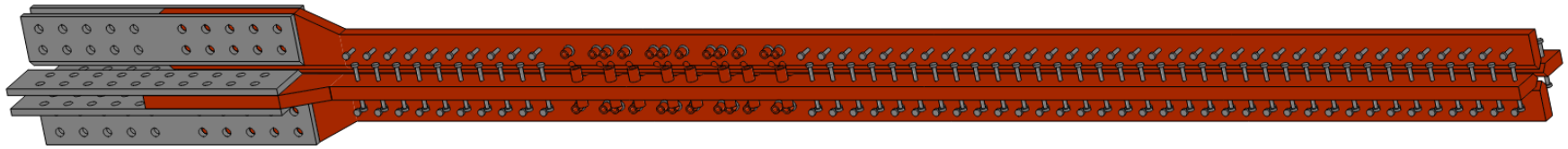


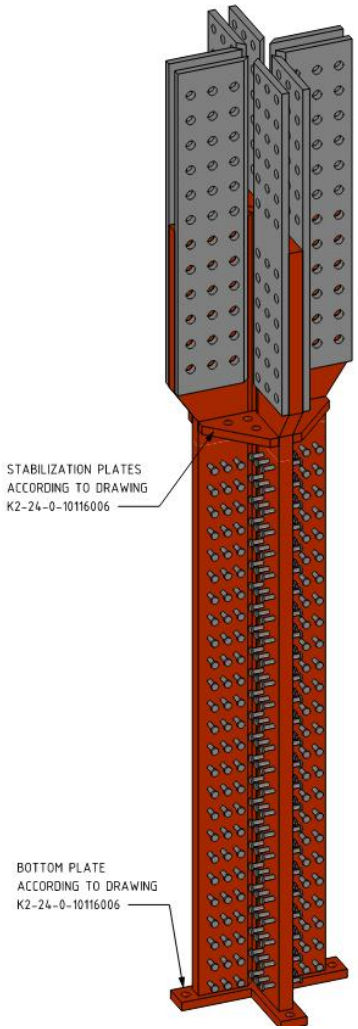


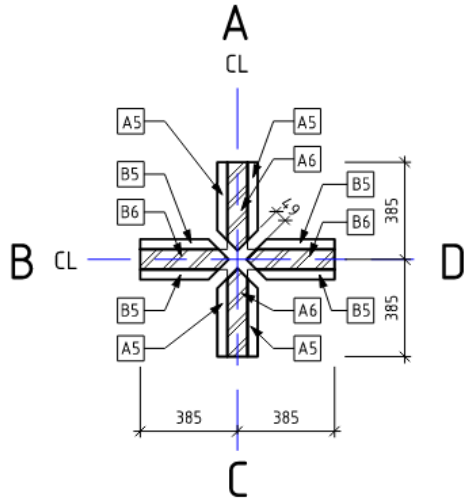

A
T-4.5
T-4.5 CL
CONNECTING OUTRIGGER REBARS COUPLERS EL32C12EE
CENTER OF GRAVITY LIFTING EYE ACCORDING TO DRAWING K2-24-0-1019006
PARTS WELDED TOGETHER
CONNECTING OUTRIGGER REBARS COUPLERS EL32C12EE
T-0.5 CL
T-0.5
CONNECTING REBARS COUPLERS EL40C13N
FREE SPACE 2400 WHEN ASSEMBLY ON SITE
FREE SPACE 2150 WHEN ASSEMBLY ON SITE
B
C

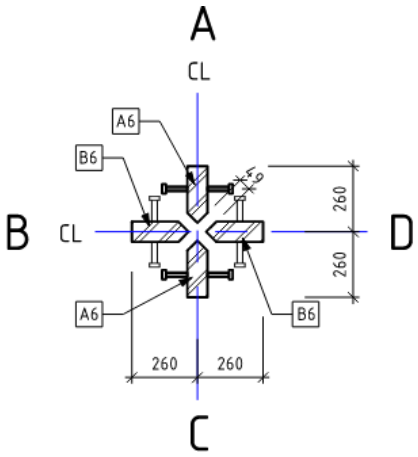


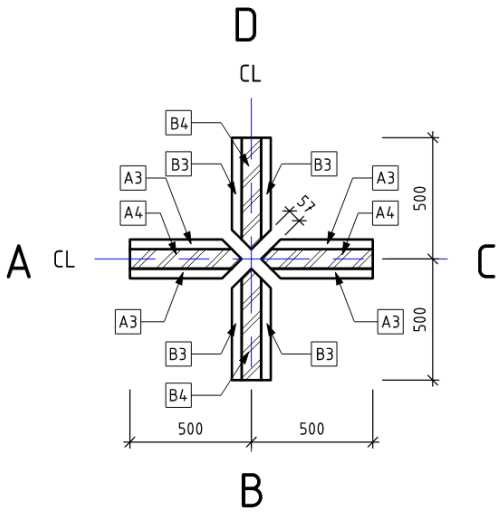

BROTTLASTER
20 MN
33.5 MN
26.5 MN
12.5 MN
10.5 MN
45 MN

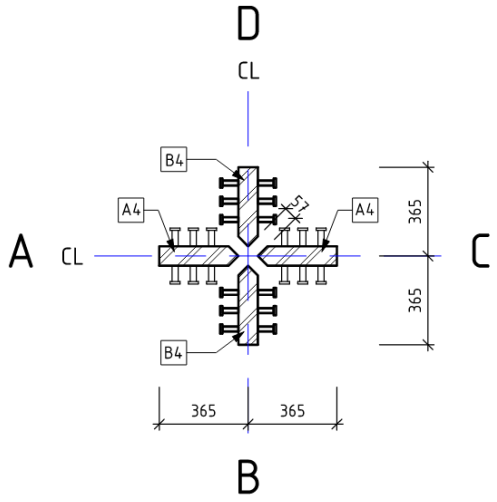


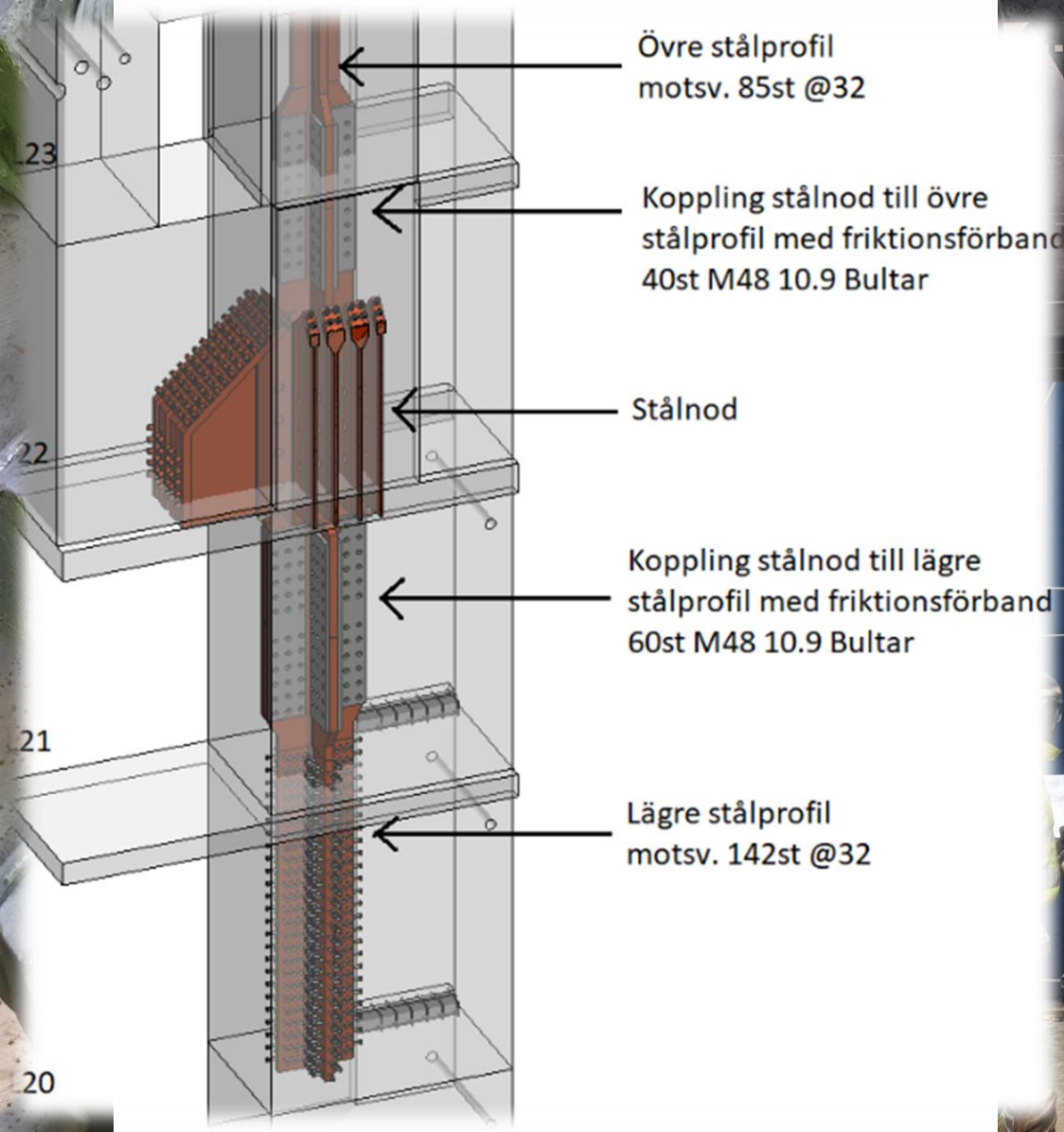

STABILIZATION PLATES
ACCORDING TO DRAWING
K2-24-0-10116006
BOTTOM PLATE
ACCORDING TO DRAWING
K2-24-0-10116006


A
CL
A5
A6
B5
B6
5.9
385
B
CL
D
C
385


A
CL
A6
B6
5.9
260
B
CL
D
C
260


D
CL
B4
B3
A3
A4
5.1
500
A
CL
C
B
500


D
CL
B4
A4
5.1
365
A
CL
C
B
365



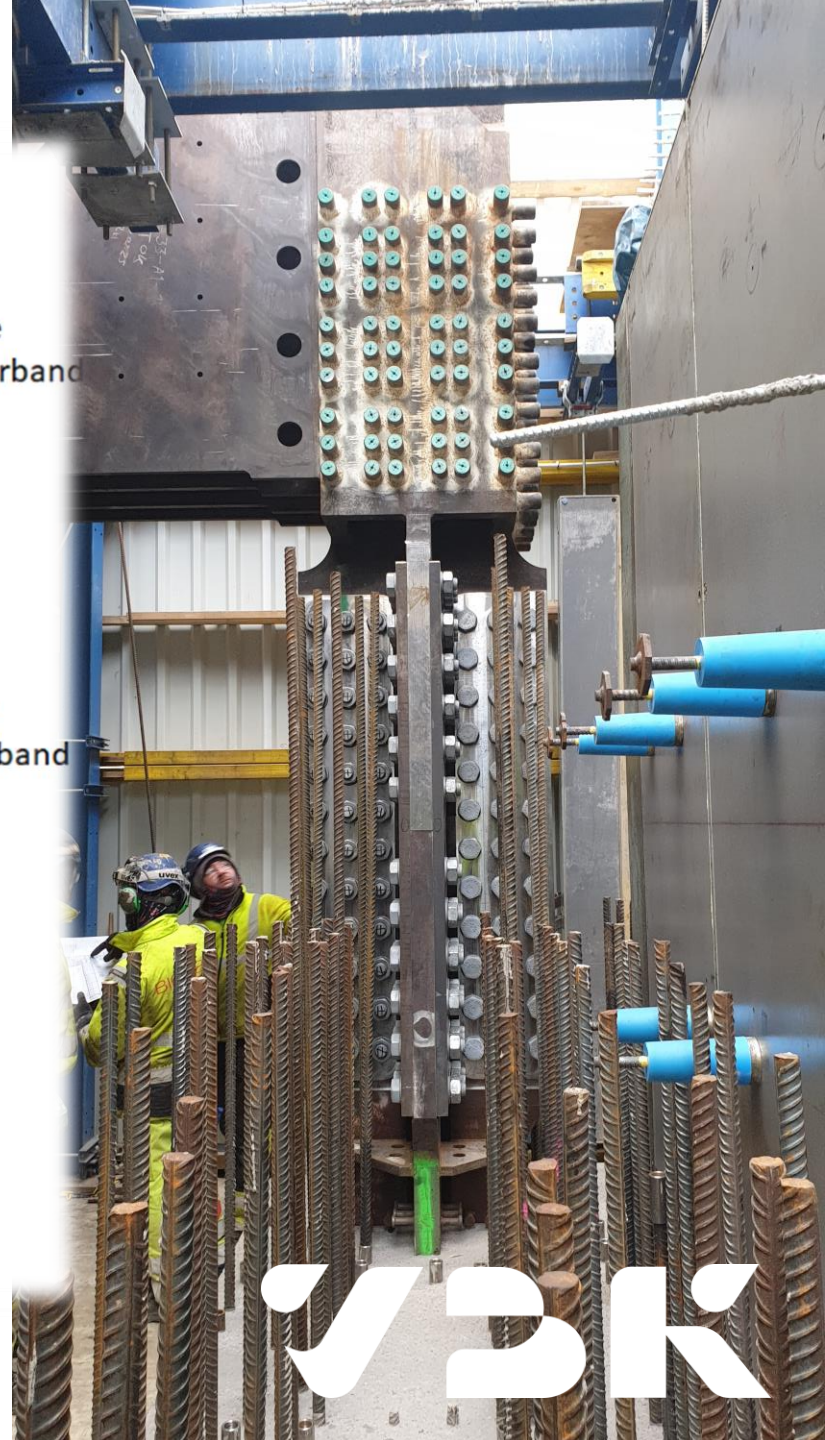
Övre stålprofil
motsv. 85st @32

Koppling stålnod till övre
stålprofil med friktionsförband
40st M48 10.9 Bultar

Stålnod

Koppling stålnod till lägre
stålprofil med friktionsförband
60st M48 10.9 Bultar

Lägre stålprofil
motsv. 142st @32



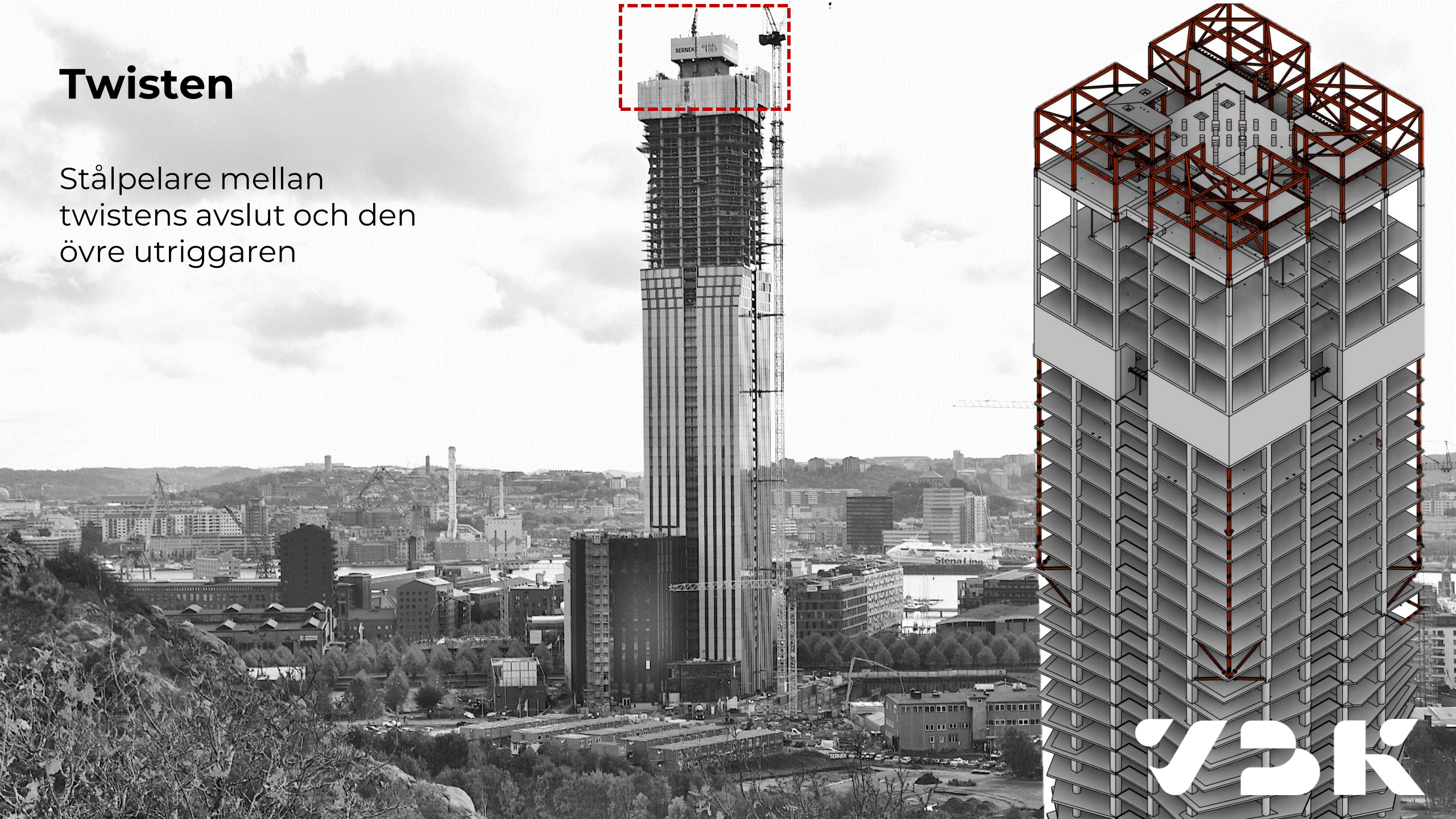
Twisten - hängpelare

Twisten

Inga hörnpelare

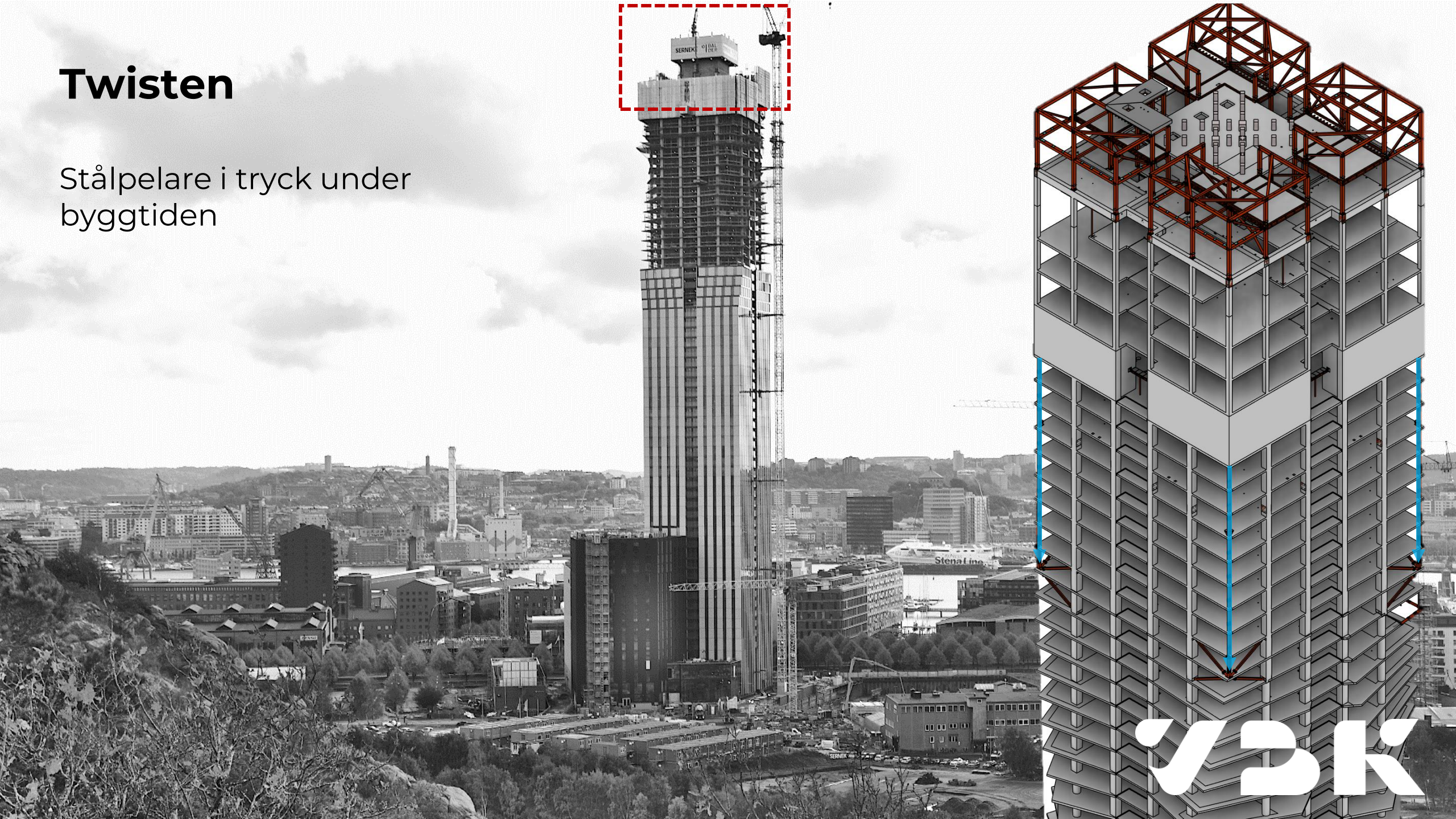
Twisten

Stålpelare mellan twistens avslut och den övre utriggaren



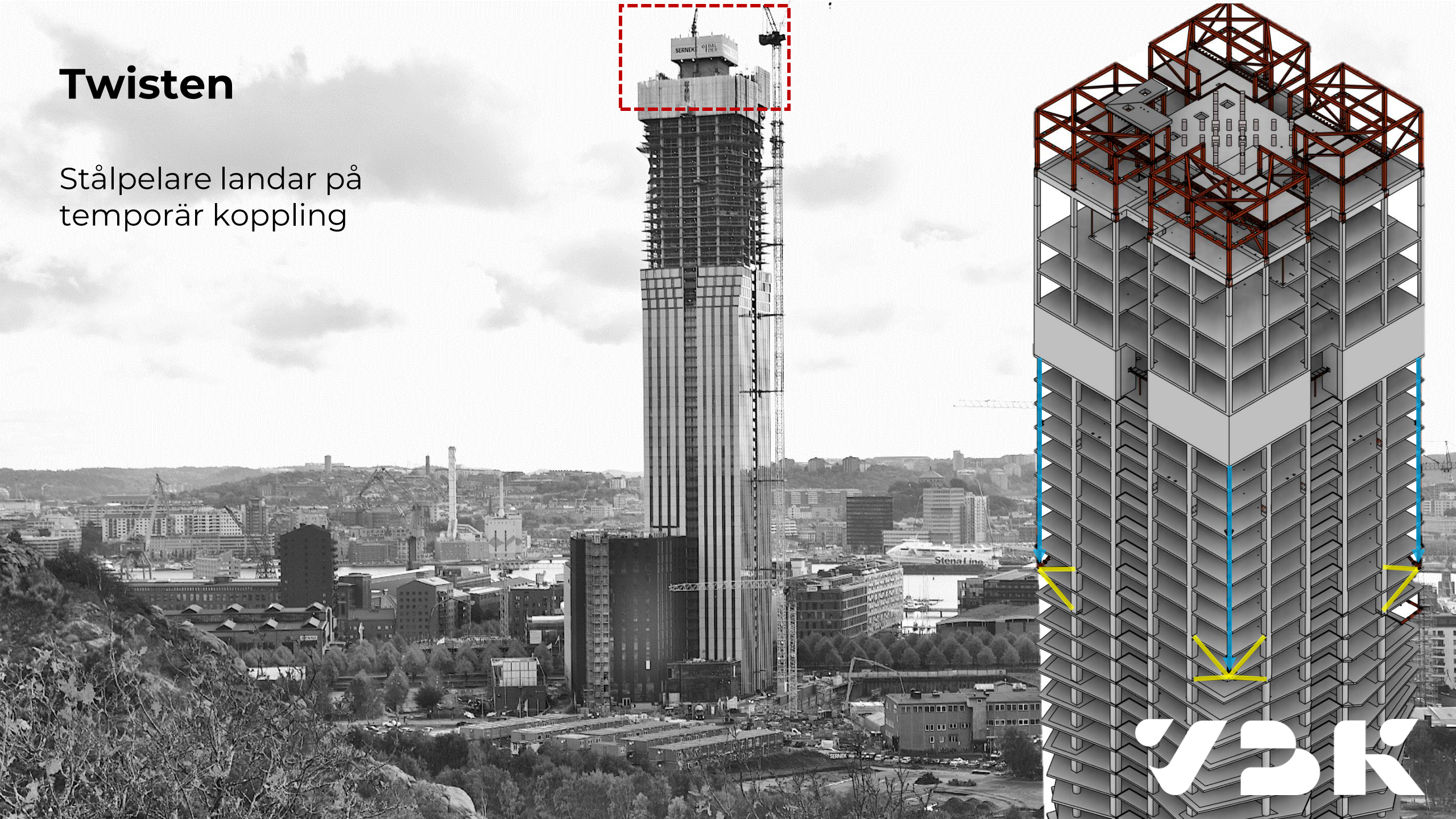
Twisten

Stålpelare i tryck under byggtiden



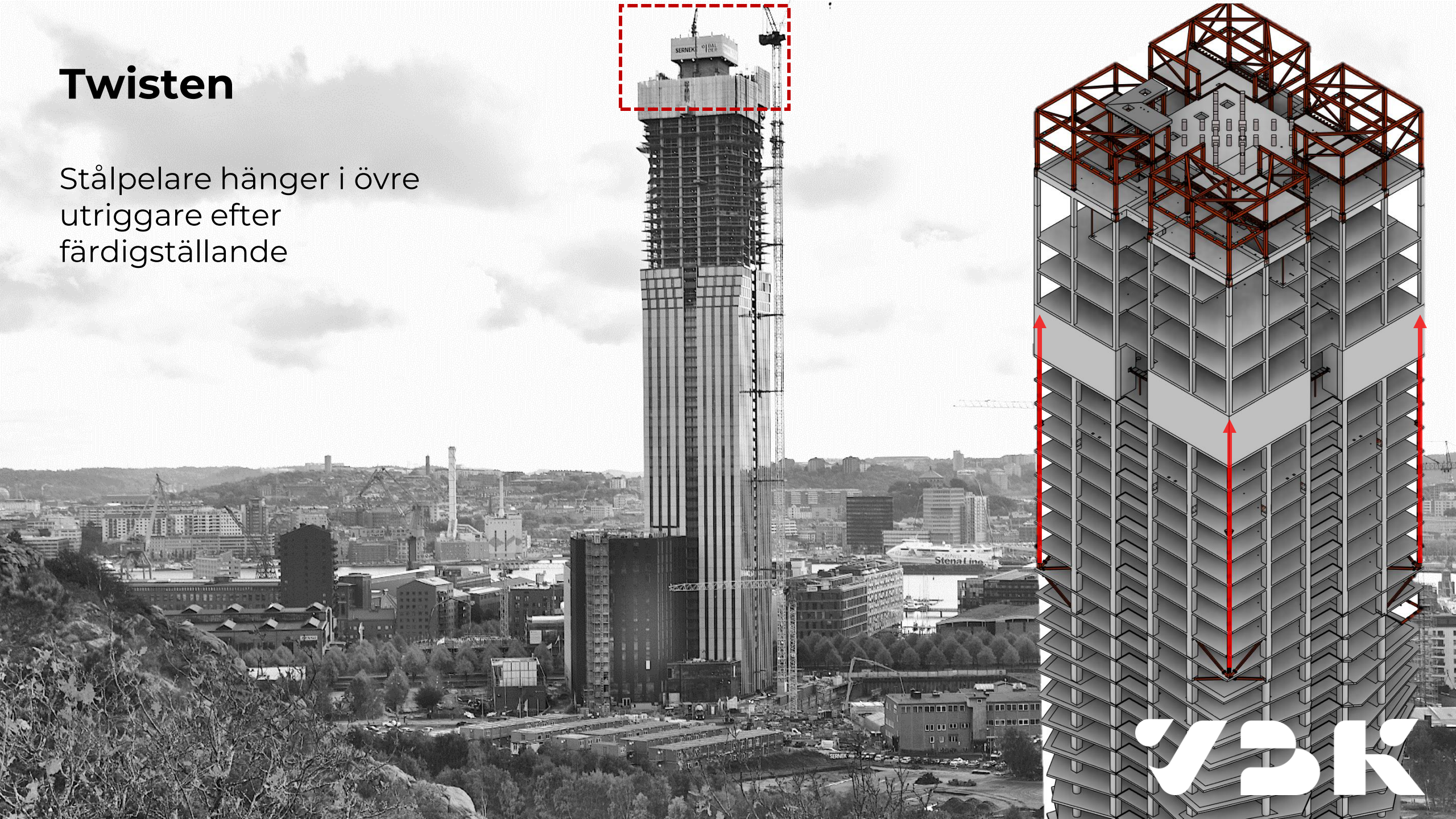
Twisten

Stålpelare landar på
temporär koppling

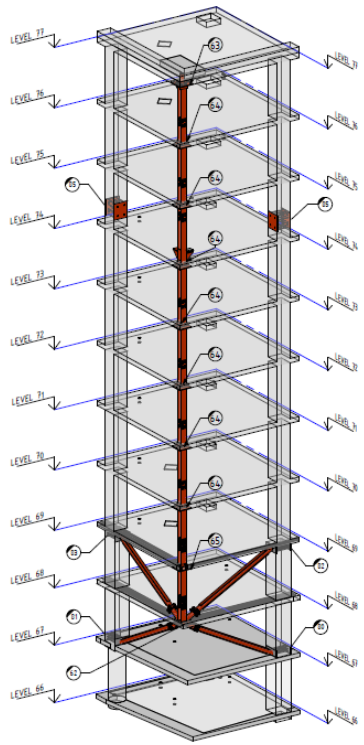


Twisten

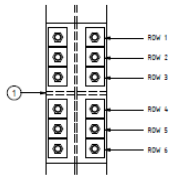
Stålpelare hänger i övre utriggare efter färdigställande



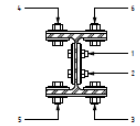

D1431281
K2-24-6-10113522
LEVEL 69
+189.850
LEVEL 68
+186.750
LEVEL 67
+183.650
880
110
240
1850
AIR BETWEEN COLUMNS 20
880
110
240
27.7°
300
PL 40x160
TEMP. STRUT
SB142 L=5072
JFR. D1431215
K2-24-6-10113512
SB142
65
83
2
1
300
K2-24-6-10113512
JFR. D1431215
PL 40x160
TEMP. STRUT
SB142 L=5106
PL 40x160
SB142
62
K2-24-6-10113512
D1431214
81
300
27.6°
ø 900
E144001
K2-24-6-10113510
S10



3D - HANGING COLUMN



D1431212 WORKFLOW 1 : 10



D1431213 WORKFLOW ① 1 : 10

2022-09-27 11:57

WORKFLOW HANGING COLUMNS

1. MAKE SURE CAST-IN ITEMS IN COLUMNS ON LEVEL 67 FITS IN THE PROPER POSITIONS WHEN CASTING THE COLUMNS SPANNING FROM LEVEL 66-67. IT IS A PRECISE ALIGNED FIT BETWEEN THE REBARS AND IT IS NOT POSSIBLE TO FIX AFTER THE COLUMNS 166-671 ARE CASTED.
2. CASTING SLAB AT LEVEL 67.
3. PREASSEMBLE CAST-IN ITEM FOR COLUMN. THE LOWER INCLINED STRUTS, CAST-IN ITEMS FOR SLAB AND TEMPORARY SUPPORT POINT UNDER CAST-IN ITEM FOR SLAB) ON GROUND LEVEL.
4. INSTALLATION OF THE FIRST PACKAGE OF STIRRUPS (3 No. OF L-BARS) ONTO THE LAPPING BARS STICKING UP AT LEVEL 67.
5. INSTALLATION OF THE SECOND AND THIRD PACKAGE OF STIRRUPS (3+3 No. OF L-BARS) WHEN PLACING THE PREASSEMBLED PACKAGE UNIT OF STEEL IN THE COLUMN AREA. **OBSERVE THAT STIRRUPS NEEDS TO BE PLACED INSIDE THE CAST-IN ITEM PART BEFORE LOWERING THE PACKAGE OVER THE LAPPING BARS!.**
6. **SECURE ALL STEEL COMPONENTS AND ENSURE THEIR STABILITY ON THE SLAB AREA.**
7. LIFT THE REST OF THE REBAR CAGE INTO POSITION AND GUIDE VERTICAL BARS INTO POSITION OF THE STIRRUPS AND THE CAST-IN ITEM OVER THE LAPPING BARS FROM THE COLUMN BELOW.
8. CHECK RESULTS AND DO ADJUSTMENTS TO GET THE CAST-IN ITEMS AT THE DESIGNATED POSITIONS AND ANGLE. **IT IS VERY IMPORTANT THAT THE CAST-IN ITEMS ENDS UP IN THE CORRECT POSITION IN PLAN AND WITH NO UNINTENDED INCLINATION OR ROTATION DUE TO LEVELS ABOVE AND ASSEMBLY TOWARDS LEVEL 77.**
9. CASTING OF COLUMNS SPANNING FROM LEVEL 67-68.
10. CHECK BOLTS, WASHERS, NUTS AND SHIMS SO THE FORCE WILL BE EVENLY DISTRIBUTED IN THE CONNECTION (BOLTED CONNECTION ON INCLINED BEAM) CLOSE TO THE AREA BETWEEN INCLINED STRUT AND CAST-IN ITEM.
11. INSTALL FORMWORK AND ALL COMPONENTS IN SLAB AREA ON LEVEL 68.
12. THE POSITION AND INCLINATION (CAST-IN ITEMS AND COLUMNS) SHOULD BE CHECKED AGAIN TO AVOID FUTURE PROBLEMS BEFORE CASTING SLAB LEVEL 68.
13. CASTING SLAB AT LEVEL 68.
14. BEFORE THE PT-TENSION IS APPLIED THE BOLTED CONNECTION SHOULD BE LOOSENED AND REMOVAL OF SHIMS SO NO LOAD IS TRANSFERRED DURING THE PHASE WITH TENSION OF THE STRANDS IN THE SLAB. ALL LOAD SHOULD BE TRANSFERED BY THE TEMPORARY SUPPORT POINT UNDER CAST IN ITEM IN SLAB ON LEVEL 681 VERTICALLY.
15. AFTER PT-TENSION IS COMPLETED THE BOLTED CONNECTION SHOULD BECOME ACTIVE AGAIN BY INSERTING SHIMS AND TIGHTENING THE NUTS SO THE FORCE WILL BE EVENLY DISTRIBUTED IN THE CONNECTION.
16. POSITION THE REBAR CAGES ON LEVEL 68-69 OVER THE LAPPING BARS FROM COLUMNS BELOW.
17. LIFT THE PREINSTALLED INCLINED STRUT PACKAGE (CAST-IN ITEM FOR COLUMN INCLUDED IN PACKAGE) UP TO THE DESIGNATED LEVEL 68-69
18. INSTALLATION OF THE TOP TWO STIRRUPS (3+3 No. OF L-BARS) WHEN PLACING THE PREASSEMBLED PACKAGE UNIT OF STEEL IN THE COLUMN AREA. **OBSERVE THAT STIRRUPS NEEDS TO BE PLACED INSIDE THE CAST-IN ITEM PART BEFORE LOWERING THE PACKAGE OVER THE LAPPING BARS!.**
19. CAST-IN ITEMS IN COLUMNS (LEVEL 68-69) IS INSTALLED IN TOP OF REBAR CAGES WITH TEMPORARY SUPPORT POINTS TO GET THE PREINSTALLED PACKAGE FIXED IN THE RIGHT POSITIONS.
20. CHECK RESULTS AND DO ADJUSTMENTS TO GET THE CAST-IN ITEMS AT THE DESIGNATED POSITIONS AND ANGLE.
21. CHECK BOLTS, WASHERS, NUTS AND SHIMS SO THE FORCE WILL BE EVENLY DISTRIBUTED IN CONNECTION BETWEEN INCLINED STRUT AND CAST-IN ITEM.
22. **SECURE ALL STEEL COMPONENTS AND ENSURE THEIR STABILITY ON THE SLAB AREA.**
23. CASTING OF COLUMNS SPANNING FROM LEVEL 68-69 UP TO THE POSITION OF CAST-IN ITEM. **THE TOP OF THE COLUMN WILL BE CASTED WITH THE SLAB ON LEVEL 69 (A PUDDLE WITH THE SAME CONCRETE QUALITY AS A COLUMN POUR).**
24. INSTALL NEXT PART OF STEEL COLUMNS AND CAST-IN ITEMS (LEVEL 68-69).
25. THE BOLTS SHOULD BE INSTALLED IN CENTER OF THE VERTICAL SLOTTED HOLE WITH SQUARE WASHERS. **THIS IS IMPORTANT FOR THE DEMOUNT OF THE TEMPORARY CONSTRUCTION IN THE BOTTOM (LEVEL 69-69) ITO RELIEVE LOAD FROM IT AND TRANSFORM IT TO A HANGING COLUMN!.**
26. CASTING OF SLAB LEVEL 69 INCLUDING THE TOP PORTION OF COLUMN (CAST-IN ITEM AREA) SPANNING FROM LEVEL 68-69. **THE TOP OF THE COLUMN AND SLAB AREA NEED TO BE A PUDDLE WITH THE SAME CONCRETE QUALITY AS A COLUMN POUR.**
27. BEFORE THE PT-TENSION IS APPLIED THE BOLTED CONNECTION SHOULD BE LOOSENED (BETWEEN LEVEL 68-69) SO NO LOAD IS TRANSFERRED DURING THE TENSION OF THE STRANDS IN THE SLAB. ALL LOAD SHOULD BE TRANSFERED BY THE TEMPORARY SUPPORT POINT / TEMPORARY PROPS VERTICALLY.
28. AFTER PT-TENSION IS COMPLETED THE BOLTED CONNECTION SHOULD BECOME ACTIVE AGAIN BY TIGHTENING THE NUTS SO THE FORCE WILL BE EVENLY DISTRIBUTED IN THE CONNECTION.
29. INSTALL NEXT PART OF STEEL COLUMNS AND CAST-IN ITEMS (LEVEL 69-70).
30. THE BOLTS SHOULD BE INSTALLED IN THE CENTER OF THE VERTICAL SLOTTED HOLE WITH SQUARE WASHERS. **THIS IS IMPORTANT FOR THE DEMOUNT OF THE TEMPORARY CONSTRUCTION IN THE BOTTOM (LEVEL 69-69) ITO RELIEVE LOAD FROM IT AND TRANSFORM IT TO A HANGING COLUMN!.**
31. INSTALL PART OF STEEL COLUMN AND CAST-IN ITEMS (LEVEL 69-70).
32. CASTING OF SLAB LEVEL 70.
33. INSTALL PART OF STEEL COLUMN AND CAST-IN ITEMS (LEVEL 70-71).
34. CASTING OF SLAB LEVEL 71.
35. INSTALL PART OF STEEL COLUMN AND CAST-IN ITEMS (LEVEL 71-72).
36. CASTING OF SLAB LEVEL 72.
37. INSTALL PART OF STEEL COLUMN AND CAST-IN ITEMS (LEVEL 72-73).
38. CASTING OF SLAB LEVEL 73.
39. INSTALL PART OF STEEL COLUMN AND CAST-IN ITEMS (LEVEL 73-74). NOTE! PART WITH CONSOLE ATTACHED TO COLUMN.
40. CASTING OF SLAB LEVEL 74.
41. INSTALL PART OF STEEL COLUMN AND CAST-IN ITEMS (LEVEL 74-75).
42. CASTING OF SLAB LEVEL 75.
43. INSTALL PART OF STEEL COLUMN AND CAST-IN ITEMS (LEVEL 75-76).
44. CASTING OF SLAB LEVEL 76.
45. INSTALL PART OF STEEL COLUMN AND CAST-IN ITEMS (LEVEL 76-77). THE COLUMNS SHOULD NOT BE ATTACHED TO THE BOTTOM PLATE IN THE OUTRIGGER AT THIS STAGE. **NOTE! THE COLUMN SHOULD BE SHORTER THAN BOTTOM OF LEVEL 77 (APPROX 20MM).**
46. INSTALL THE DOKA TRUSSES BETWEEN LEVEL 74-75.
47. INSTALL THE PROPS TO TRANSFER LOAD DOWN TO THE DOKA TRUSSES (BETWEEN LEVEL 75-76).
48. INSTALL THE PROPS TO TRANSFER LOAD DOWN TO THE DOKA TRUSSES (BETWEEN LEVEL 76-77).
49. INSTALL ALL PARTS IN SLAB ON LEVEL 77 (IT SHOULD STILL BE APPROX 20MM GAP BETWEEN BOTTOM PLATE IN THE CORNER AND THE TOP OF THE STEEL COLUMN).
50. CASTING OF SLAB LEVEL 77.
51. INSTALL STEEL PLATES TO **THE BOTTOM SIDE OF THE CAST-IN ITEMS FOR GUIDING THE TOP OF THE STEEL COLUMNS SPANNING FROM LEVEL 76 TO 77. NOTE! DO NOT WELD THE PLATES TO THE STEEL COLUMNS AT THIS STAGE** (DETAILS D1431201-D1431203.)
52. CASTING OF BELT WALLS
53. CASTING OF OUTRIGGER WALLS
54. CASTING OF SLAB LEVEL 78.
55. CASTING OF SLAB LEVEL 79.
56. DEMOUNT THE PROPS TO TRANSFER LOAD DOWN TO THE DOKA TRUSS (BETWEEN LEVEL 76-77).
57. DEMOUNT THE PROPS TO TRANSFER LOAD DOWN TO THE DOKA TRUSS (BETWEEN LEVEL 75-76).
58. DEMOUNT THE DOKA TRUSS ON LEVEL 74-75.
59. INSTALL (WELD) THE STEEL PLATES TO THE STEEL COLUMN AT LEVEL 77 (DETAILS D1431201-D1431203).

START OF TRANSFERING THE CORNER STEEL COLUMN FROM COMPRESSED TO HANGING COLUMN

60. STEEL CONNECTION ON THE HANGING STEEL COLUMN BETWEEN LEVEL 68-69. RELEASE THE CONNECTION ACCORDING TO THE INSTRUCTIONS BELOW (FOR ROW AND No. SEE DETAILS 1431212 AND 1431213):
    - ADJUST TIGHTNESS FOR SCREW No. 1 45° DEGREES IN ROW 1. ADJUST TIGHTNESS FOR SCREW No. 2 45° DEGREES IN ROW 1 AND CONTINUE UNTIL SCREW No. 6 IN ROW 1.
    - ADJUST TIGHTNESS FOR SCREW No. 1 45° DEGREES IN ROW 2. ADJUST TIGHTNESS FOR SCREW No. 2 45° DEGREES IN ROW 2 AND CONTINUE UNTIL SCREW No. 6 IN ROW 2.
    - ADJUST TIGHTNESS FOR SCREW No. 1 45° DEGREES IN ROW 3. ADJUST TIGHTNESS FOR SCREW No. 2 45° DEGREES IN ROW 3 AND CONTINUE UNTIL SCREW No. 6 IN ROW 3.
    - ADJUST TIGHTNESS FOR SCREW No. 1 45° DEGREES IN ROW 4. ADJUST TIGHTNESS FOR SCREW No. 2 45° DEGREES IN ROW 4 AND CONTINUE UNTIL SCREW No. 6 IN ROW 4.
    - ADJUST TIGHTNESS FOR SCREW No. 1 45° DEGREES IN ROW 5. ADJUST TIGHTNESS FOR SCREW No. 2 45° DEGREES IN ROW 5 AND CONTINUE UNTIL SCREW No. 6 IN ROW 5.
    - ADJUST TIGHTNESS FOR SCREW No. 1 45° DEGREES IN ROW 6. ADJUST TIGHTNESS FOR SCREW No. 2 45° DEGREES IN ROW 6 AND CONTINUE UNTIL SCREW No. 6 IN ROW 6.
61. REPEAT PROCESS WITH ADJUSTING TIGHTNESS FOR SCREWS IN ROW 1-6 UNTIL ALL PRELOADING AND CONTACT SURFACES ARE CLEAR AND MOVES FREELY.
62. INSPECT CONDITIONS BELOW:
    CONDITION 1: ALL BOLTS SHALL BE ABLE TO MOVE FREELY IN THE SLOTTED HOLE POSITION.
    CONDITION 2: THE STEEL COLUMNS SHALL **NOT** BE IN CONTACT WITH EACH OTHER (20mm GAP IS CLOSED).
    IF THE ANSWER ON BOTH STATED CONDITIONS ARE:
    - YES = CONTINUE WITH POINTS 63 AND 64 BELOW AND THEN JUMP TO POINT 65.
    - NO = CONTINUE WITH POINT 63 AND ONWARDS.
63. DISCARD ALL USED BOLTS, WASHERS AND NUTS.
64. INSTALLATION OF NEW SETS OF BOLTS, WASHERS AND NUTS. TIGHTEN BOLTS AND MAKE VISUAL CONTROLS (REPLACE ONE BOLT AT A TIME).
65. STEEL CONNECTION BETWEEN LEVEL 69-70. RELEASE THE CONNECTION ACCORDING TO INSTRUCTIONS BELOW (FOR ROW AND No. SEE DETAILS 1431212 AND 1431213):
    - ADJUST TIGHTNESS FOR SCREW No. 1 45° DEGREES IN ROW 1. ADJUST TIGHTNESS FOR SCREW No. 2 45° DEGREES IN ROW 1 AND CONTINUE UNTIL SCREW No. 6 IN ROW 1.
    - ADJUST TIGHTNESS FOR SCREW No. 1 45° DEGREES IN ROW 2. ADJUST TIGHTNESS FOR SCREW No. 2 45° DEGREES IN ROW 2 AND CONTINUE UNTIL SCREW No. 6 IN ROW 2.
    - ADJUST TIGHTNESS FOR SCREW No. 1 45° DEGREES IN ROW 3. ADJUST TIGHTNESS FOR SCREW No. 2 45° DEGREES IN ROW 3 AND CONTINUE UNTIL SCREW No. 6 IN ROW 3.
    - ADJUST TIGHTNESS FOR SCREW No. 1 45° DEGREES IN ROW 4. ADJUST TIGHTNESS FOR SCREW No. 2 45° DEGREES IN ROW 4 AND CONTINUE UNTIL SCREW No. 6 IN ROW 4.
    - ADJUST TIGHTNESS FOR SCREW No. 1 45° DEGREES IN ROW 5. ADJUST TIGHTNESS FOR SCREW No. 2 45° DEGREES IN ROW 5 AND CONTINUE UNTIL SCREW No. 6 IN ROW 5.
    - ADJUST TIGHTNESS FOR SCREW No. 1 45° DEGREES IN ROW 6. ADJUST TIGHTNESS FOR SCREW No. 2 45° DEGREES IN ROW 6 AND CONTINUE UNTIL SCREW No. 6 IN ROW 6.
66. REPEAT PROCESS WITH ADJUSTING TIGHTNESS FOR SCREWS IN ROW 1-6 UNTIL ALL PRELOADING AND CONTACT SURFACES ARE CLEAR AND MOVES FREELY.
67. REPLACE ALL OF THE USED BOLTS, NUTS AND WASHERS WITH NEW ONES (DISCARD ALL USED BOLTS, WASHERS AND NUTS). TIGHTEN BOLTS AND MAKE VISUAL CONTROLS (REPLACE ONE BOLT AT A TIME).
68. REMOVAL OF TEMPORARY UPPER INCLINED STRUT (LEVEL 69-68). THE PROCEDURE OF RELEASING 45° DEGREES FOR EACH SCREW No. 1-3 BEFORE STARTING THE PROCESS ALL OVER AGAIN AT SCREW No. 1 SHOULD BE FOLLOWED. REPEAT UNTIL THE CONNECTION MOVES FREELY.
69. REMOVAL OF TEMPORARY LOWER INCLINED STRUT (LEVEL 67-68). THE PROCEDURE OF RELEASING 45° DEGREES FOR EACH SCREW No. 1-3 BEFORE STARTING THE PROCESS ALL OVER AGAIN AT SCREW No. 1 SHOULD BE FOLLOWED. REPEAT UNTIL THE CONNECTION MOVES FREELY.

THE COLUMN HAS NOW TRANSFORMED INTO A HANGING COLUMN

70. DEMOUNT (CUT) STEEL PARTS THATS WAS PART OF THE TEMPORARY CONSTRUCTION INCLINED STRUTS) FROM CAST-IN ITEM No. 62. IF THERE IS ANY DOUBT ON WHAT TO CUT OFF OR NOT, CONTACT THE DESIGNER.
71. INSTALLATION OF FIRE PROTECTION AT LOCATIONS THAT NEED PROTECTION AFTER DEMOUNT OF THE TEMPORARY CONSTRUCTION INCLINED STRUTS).

GENERAL REGULATIONS

FOR BUILDING DESIGN PRINCIPLES PLEASE REFER TO; K2-2009-10100-01 - ALLMÄNNA FÖRESKRIFTER

REFERENCES

FOR PLAN DIMENSIONS, REFER TO DRAWINGS BEGINNING WITH K2-20-1-10110XXXX
FOR REINFORCEMENT PLANS, PLEASE REFER TO DRAWINGS K2-22-1-10111XXXX
FOR STRUCTURAL ELEMENTS (BEAMS COLUMNS ETC.) PLEASE REFER TO DRAWING K2-01-6-10110700

FOR INFORMATION ON WALLS, PLEASE REFER TO TABLES ON DRAWINGS BEGINNING, K2-20-5-1012XXXX
FOR INFORMATION ON BEAMS, PLEASE REFER TO TABLES ON DRAWINGS BEGINNING, K2-20-5-1013XXXX
FOR INFORMATION ON COLUMNS, PLEASE REFER TO TABLES ON DRAWINGS BEGINNING, K2-20-5-1014XXXX

① BOLT GROUP, SEE DRAWING K2-24-6-10113512
② BOLT GROUP, SEE DRAWING K2-24-6-10113512
③ BOLT GROUP, SEE DRAWING K2-24-6-10113513
④ ⑤ STEEL COMPONENTS FOR DOKA TRUSS SYSTEM, SEE DRAWING K2-24-6-10113510
⑥① CAST-IN PLATE AND SLAB PLATE FOR L68, SEE DRAWING K2-24-6-10113511
⑥② CAST-IN PLATE AND SLAB PLATE FOR L70-L76, SEE DRAWING K2-24-6-10113512
⑥③ CAST-IN PLATE AND SLAB PLATE FOR L69, SEE DRAWING K2-24-6-10113513
⑦① ⑦② CAST-IN, SEE DRAWING K2-24-6-10113521
⑦③ ⑦④ CAST-IN, SEE DRAWING K2-24-6-10113522

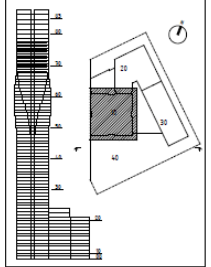
ALL STEEL PARTS IN THIS DRAWING SHOULD BE IN QUALITY S355N IF NOT STATED OTHERWISE

ALL STEEL PARTS SHOULD BE GRADED AND PAINTED TO C2 HIGH CORROSIVE CLASS TO AVOID CORROSION. HENCE NO RUST WATER CAN OCCURE AND DISCOLOUR THE FACADE DURING THE CONSTRUCTION TIME. NOTE THAT BOLT GROUP ① AND ③ SHOULD HAVE A SPECIAL COATING, SEE THE DETAILS.

ALL BOLTS, WASHERS AND NUTS SHOULD BE HOT DIPPED VFI IF NOT STATED OTHER OTHERWISE.

REV	DESCRIPTION	BY	DATE
A	PH 109	DAn	2022-09-23

KARLASTADEN



BYGGHANDLING

VBK SERNEKE

K2 VBK		TEL: 031-703 35 00
PROJECT NO. 150470	DRAWN BY DAn	CHECKED BY DAn
DATE 2022-09-23	APPROVED Ola Kjellman	

10100 KARLASTADEN 1A
HANGING COLUMN L68-77 WORKFLOW

SCALE	NUMBER	REV
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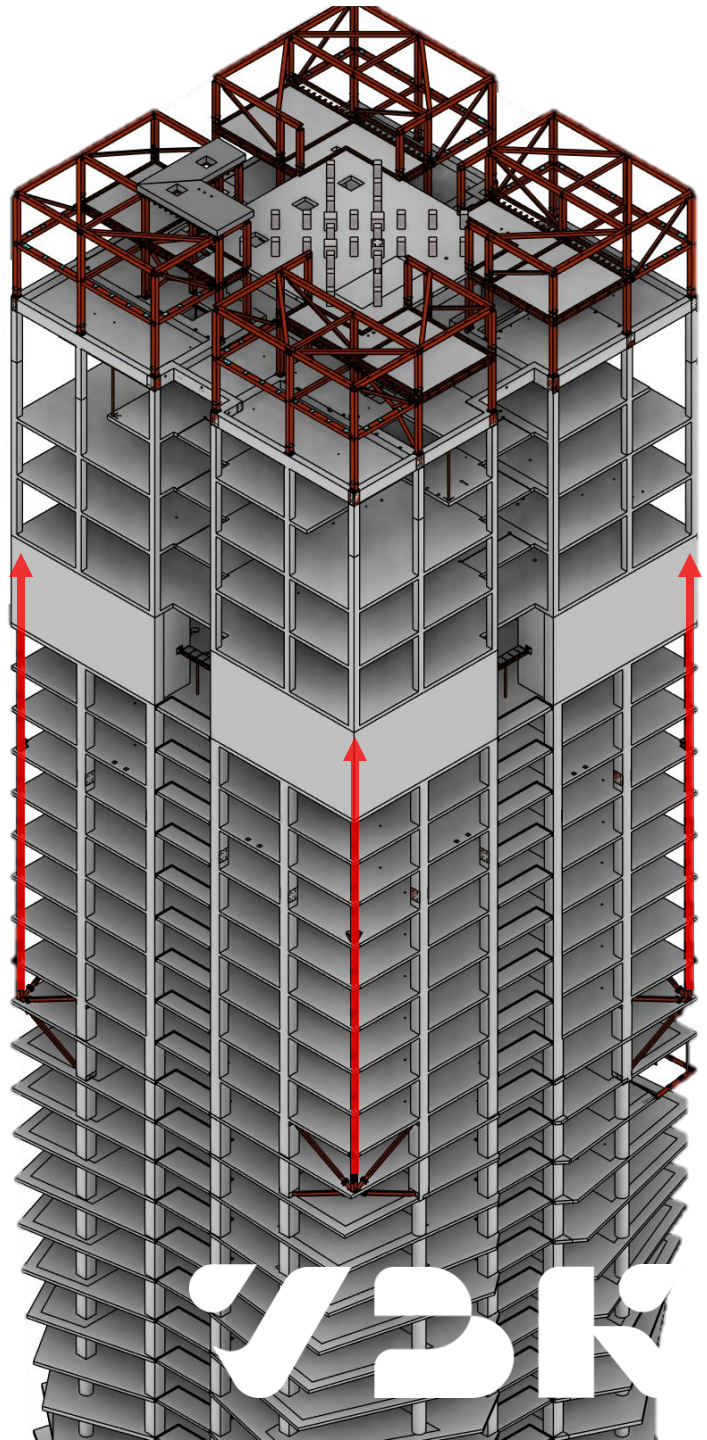
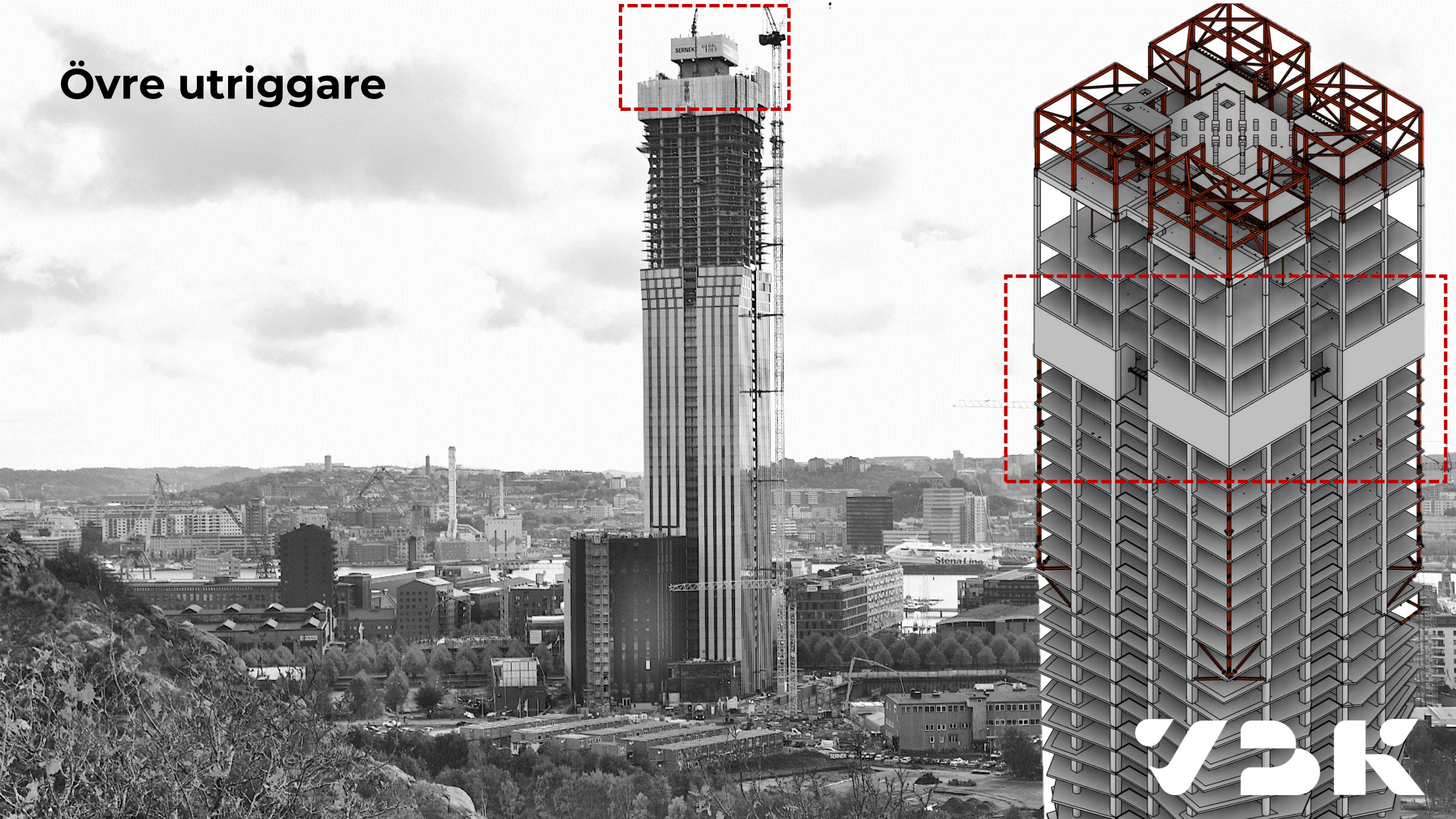
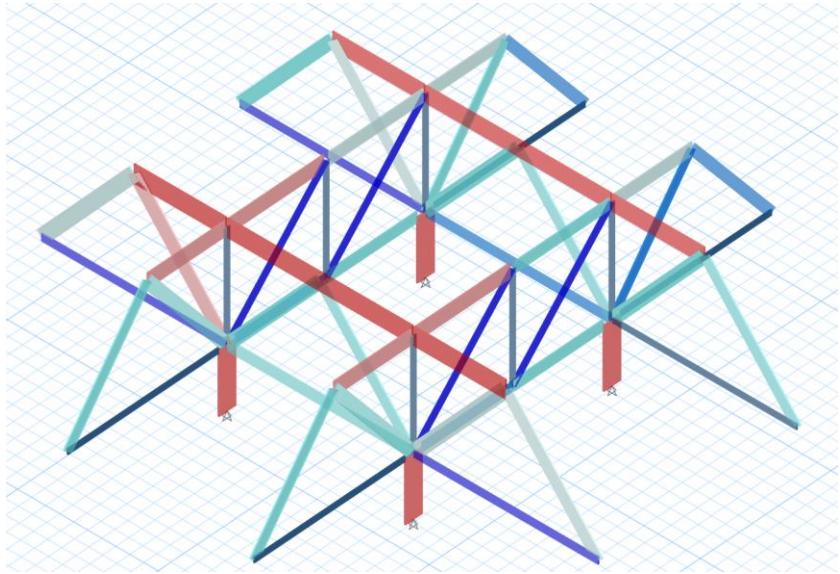


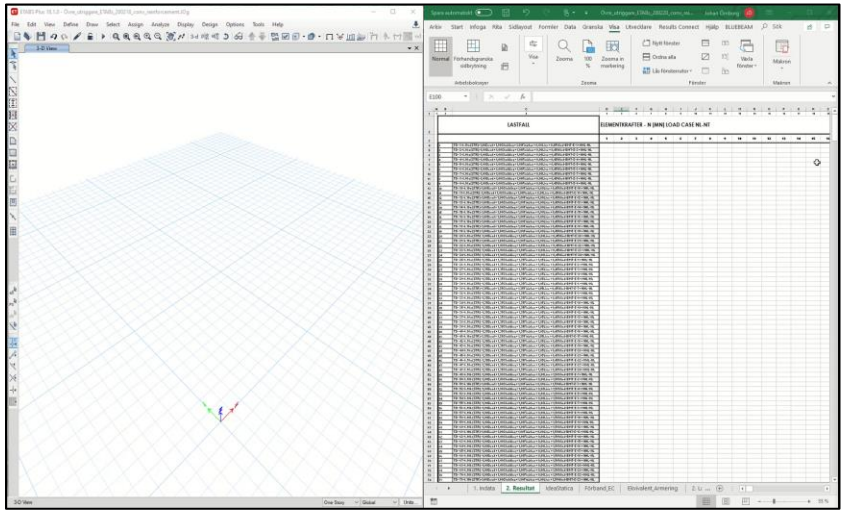
Övre utriggare

Övre utriggare

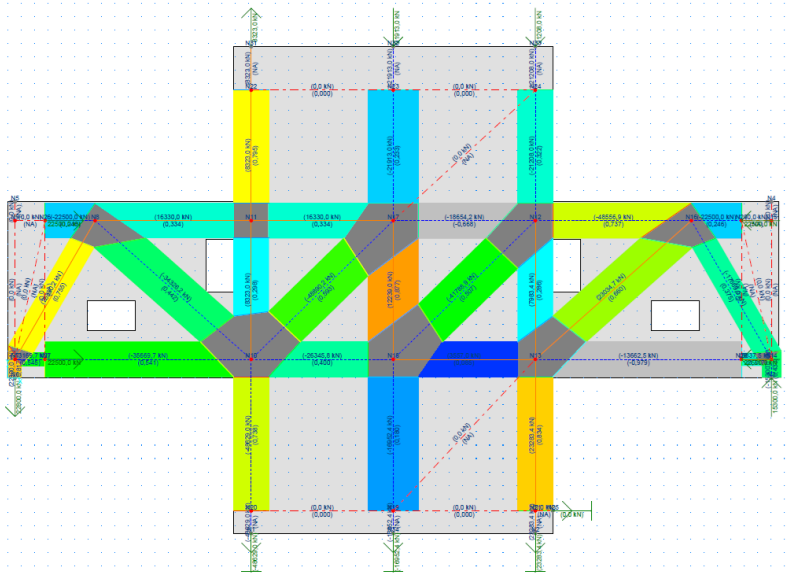


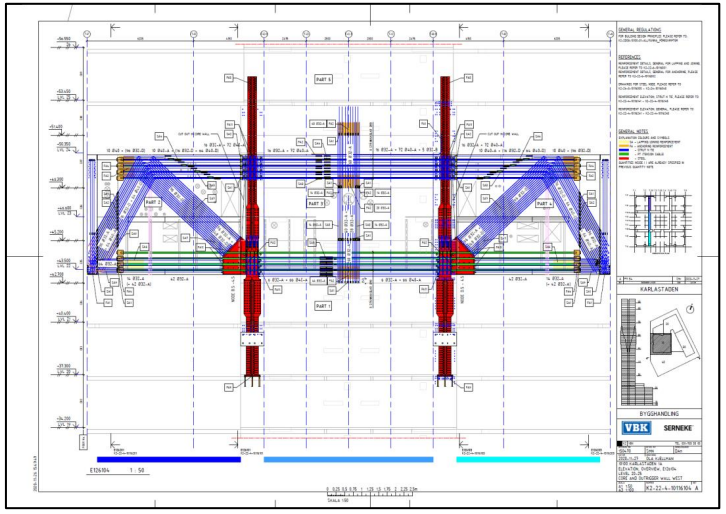
Alt. A – Ingjutet stål



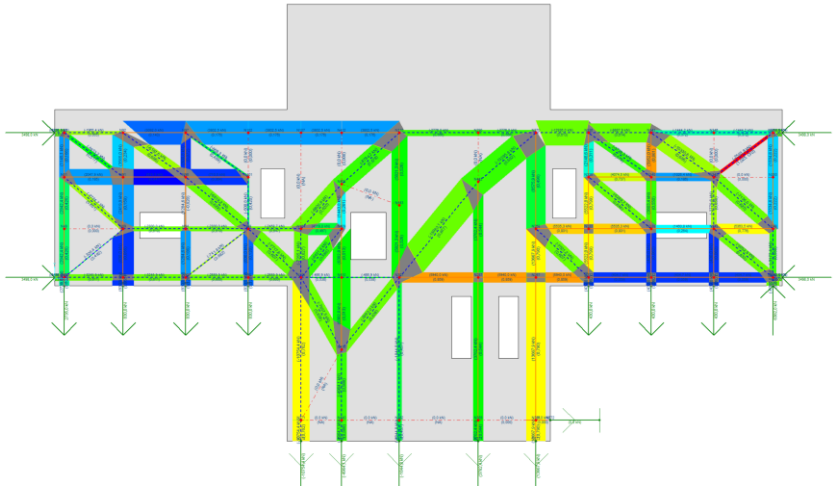


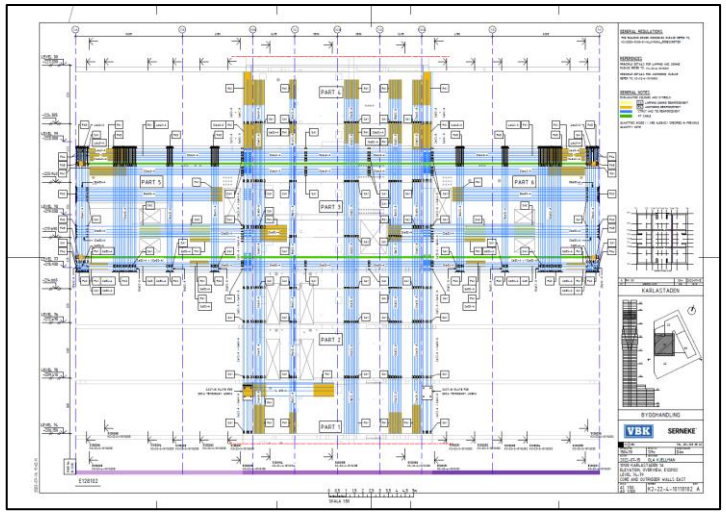
Alt. B – lutande armering

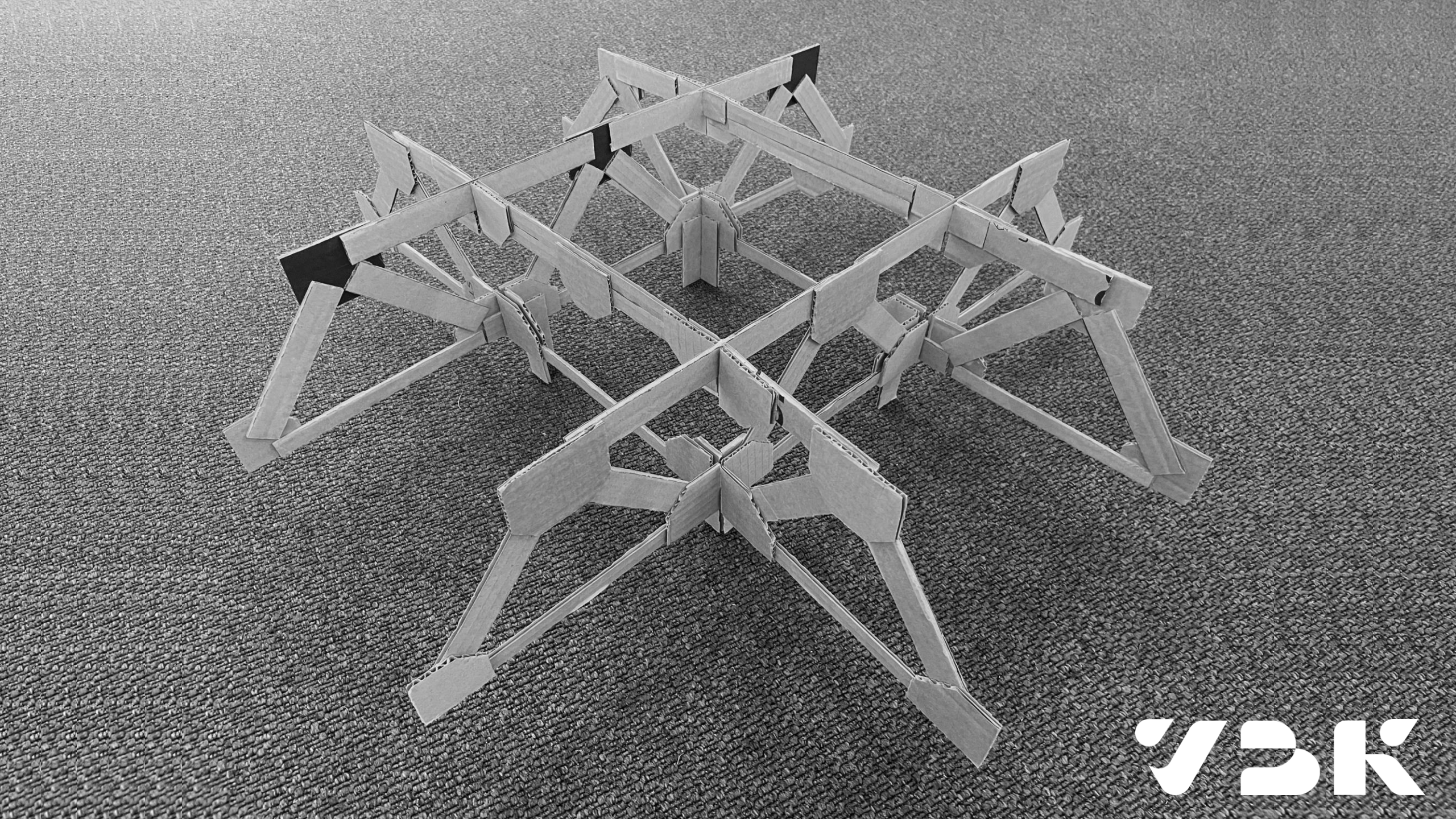


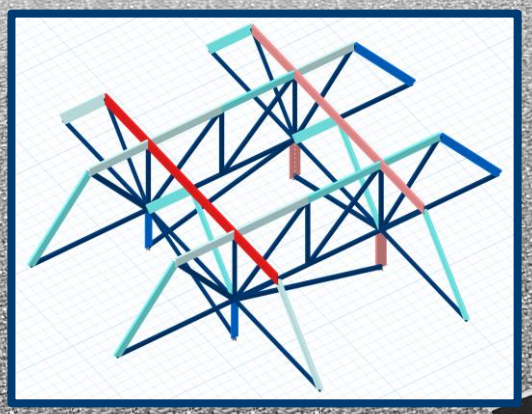


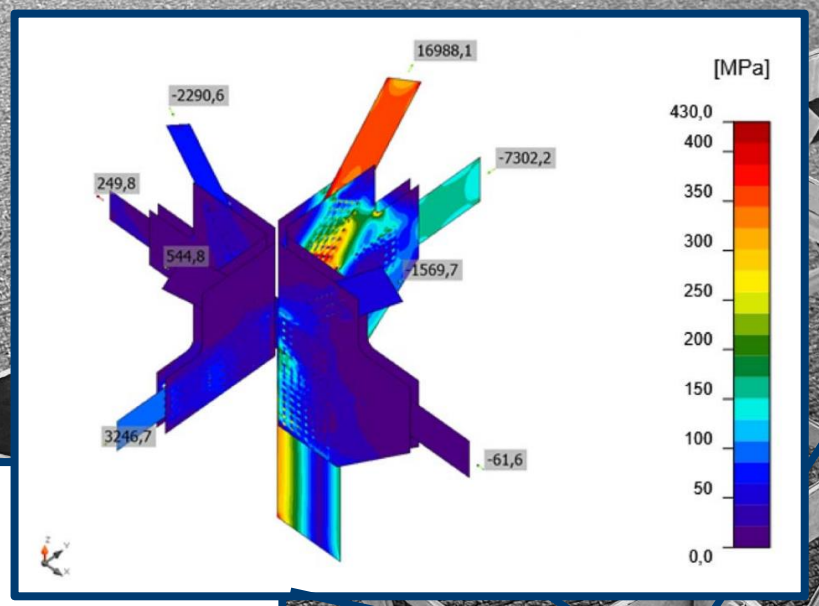
Alt. C – Ortogonal armering







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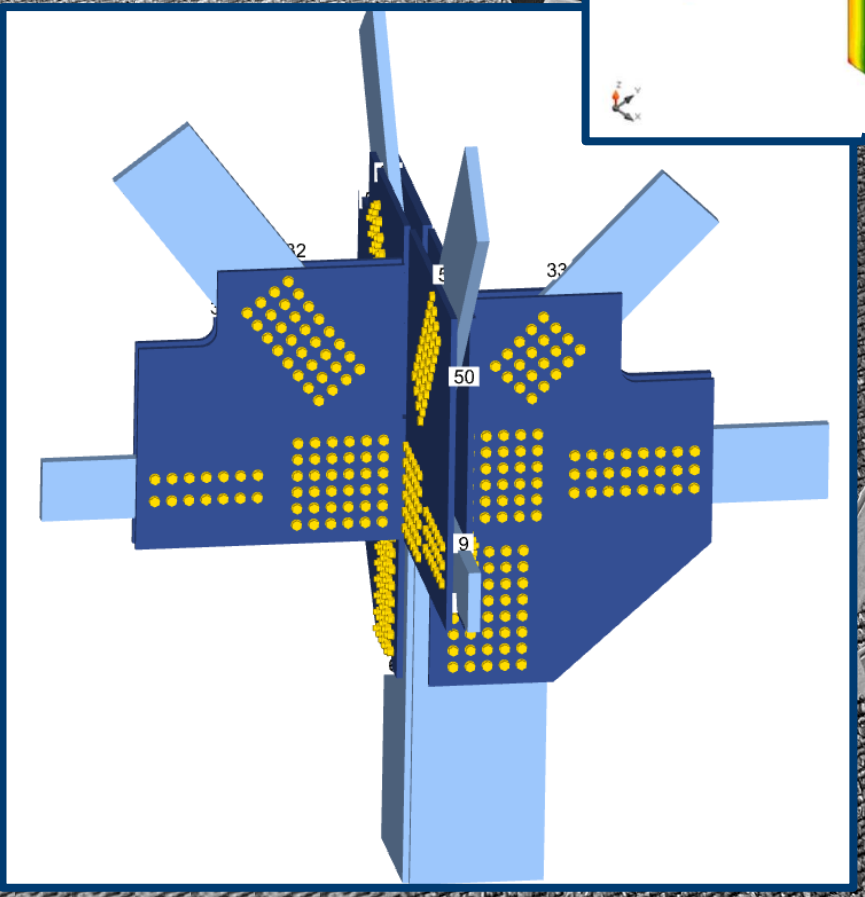
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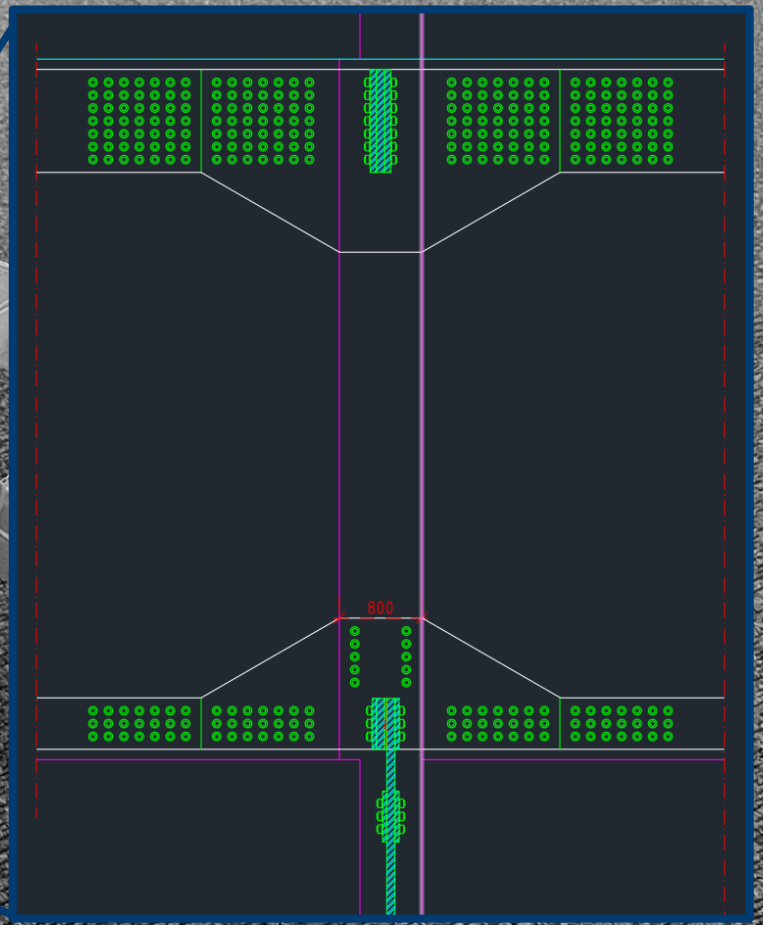
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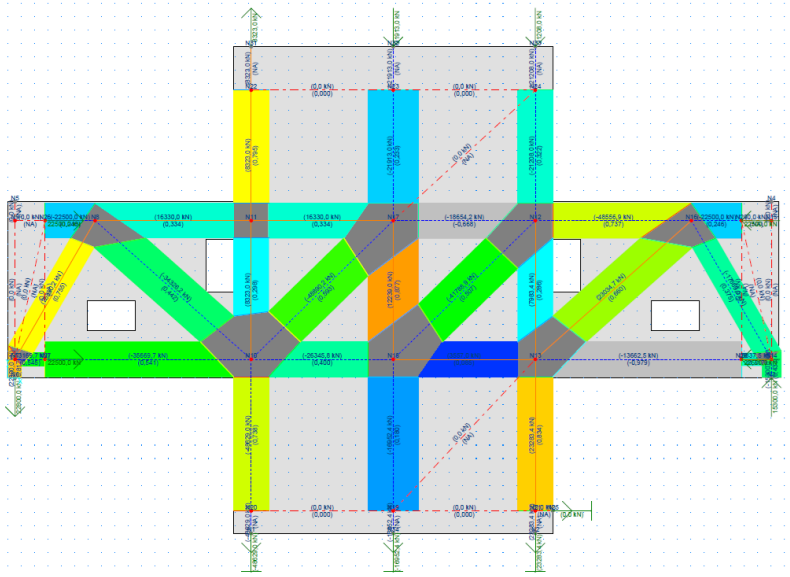
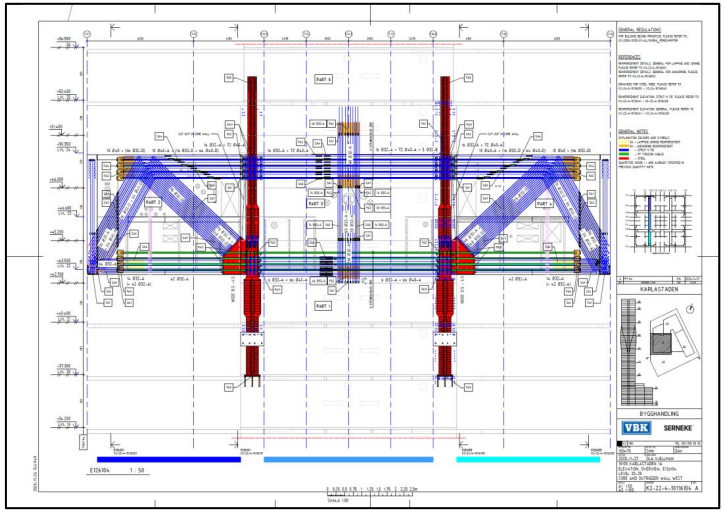
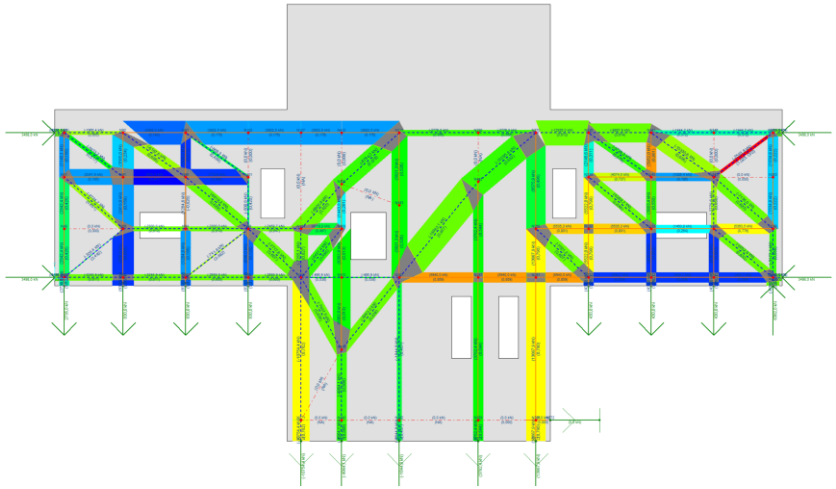
Alt. A – Ingjutet stål

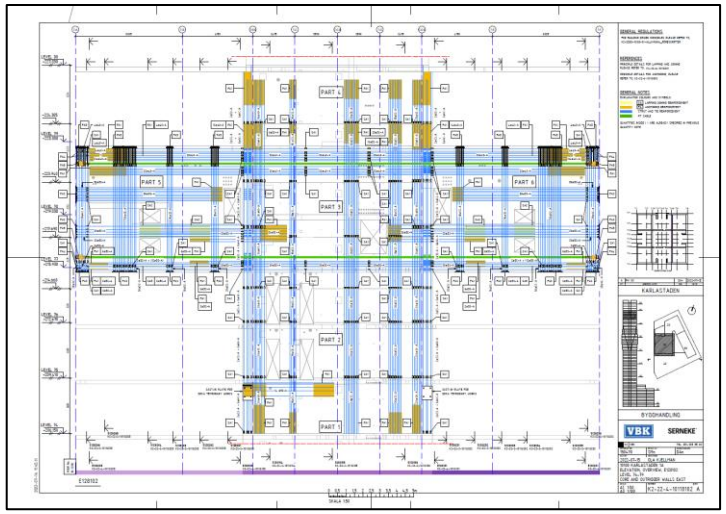
Alt. B – lutande armering





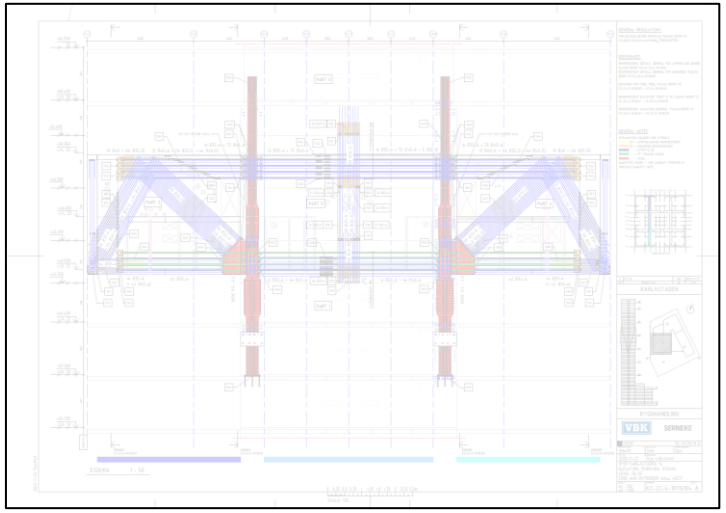
Alt. C – Ortogonal armering



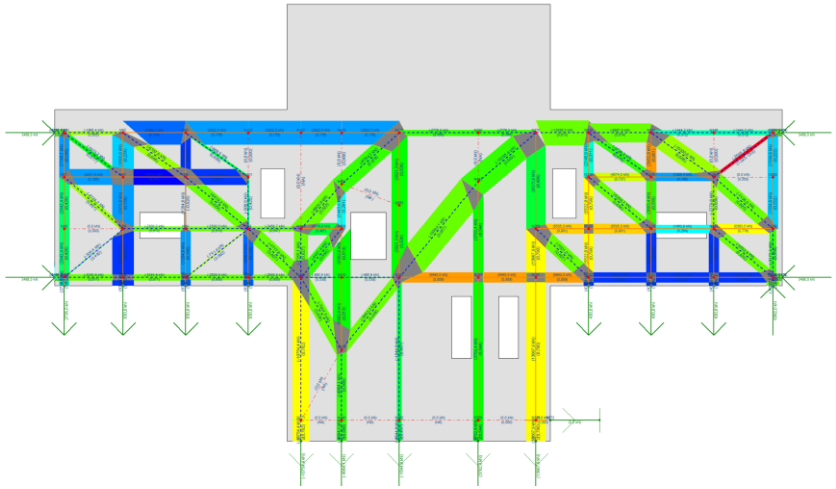


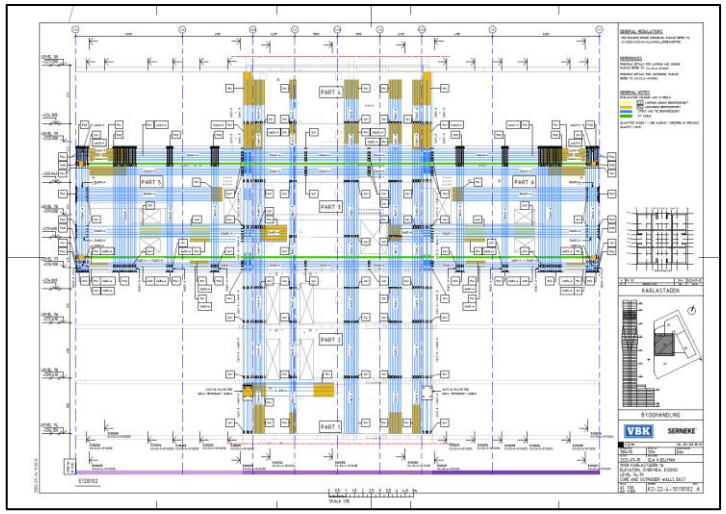
Alt. A – Ingjutet stål

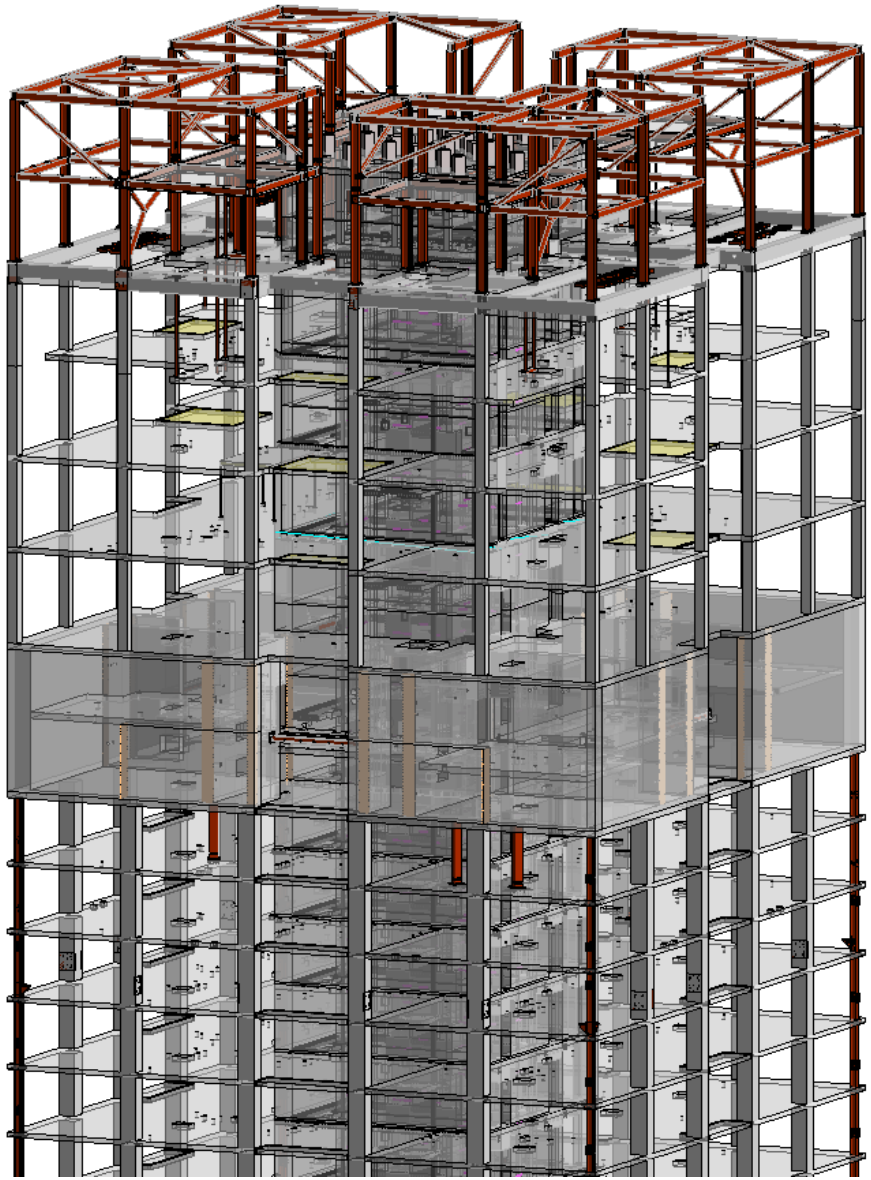
Alt. B – lutande armering



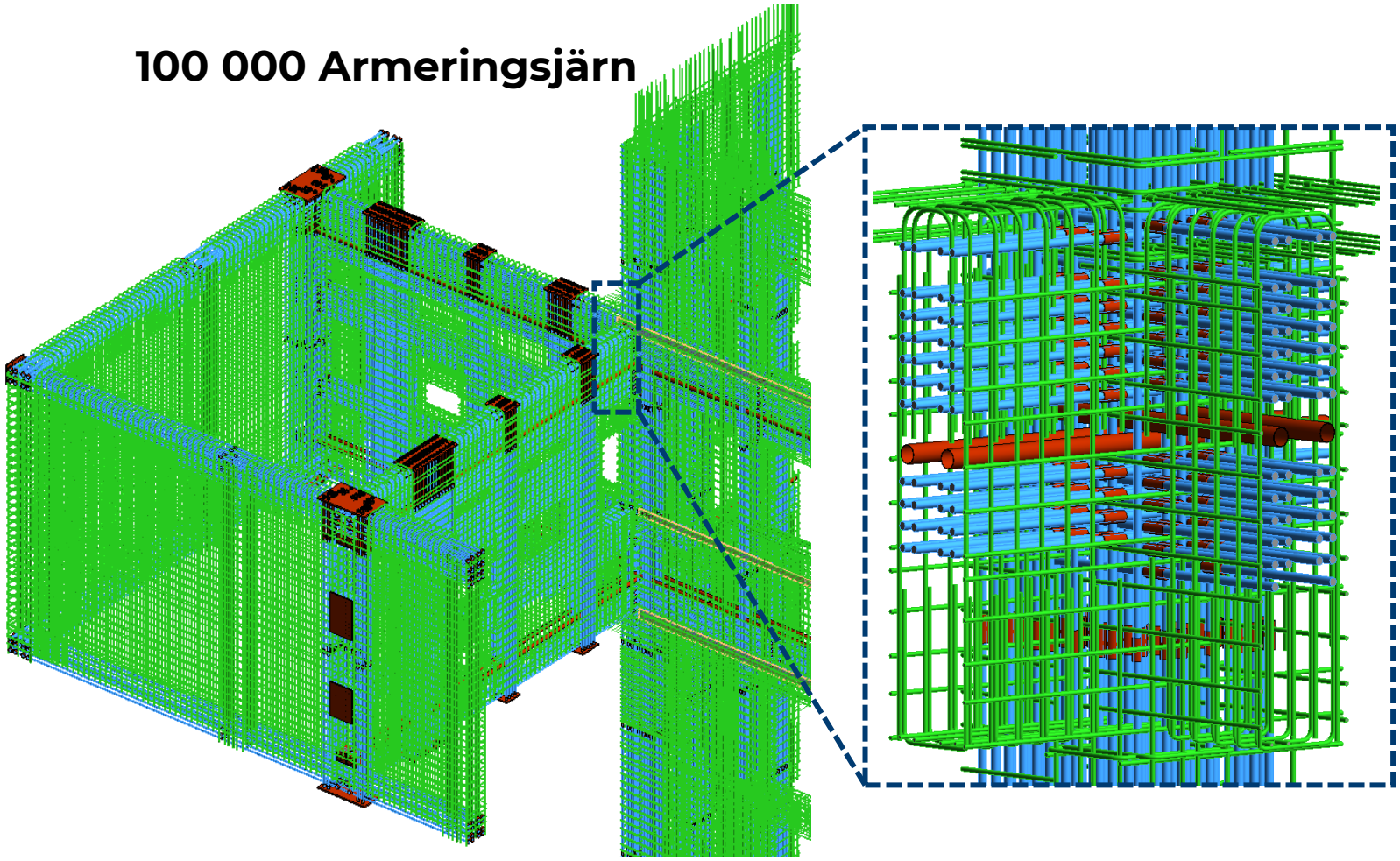
Alt. C – Ortogonal armering

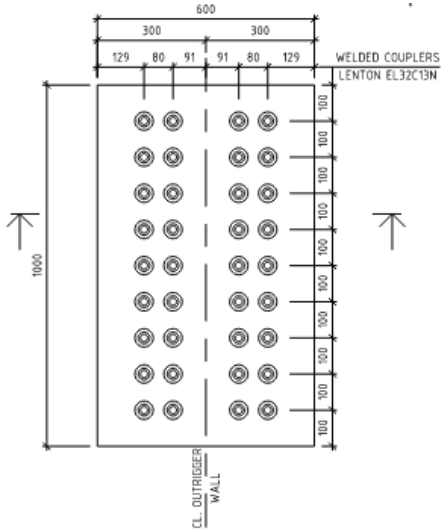






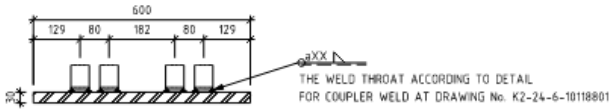
100 000 Armeringsjärn





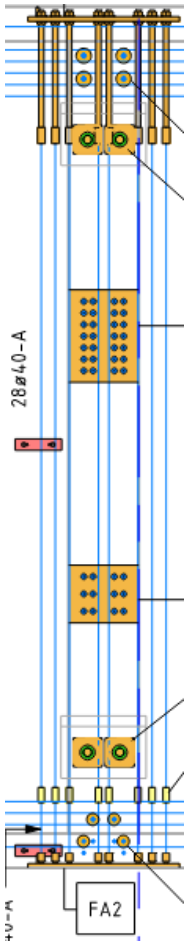
CAST-IN 810 1 : 10

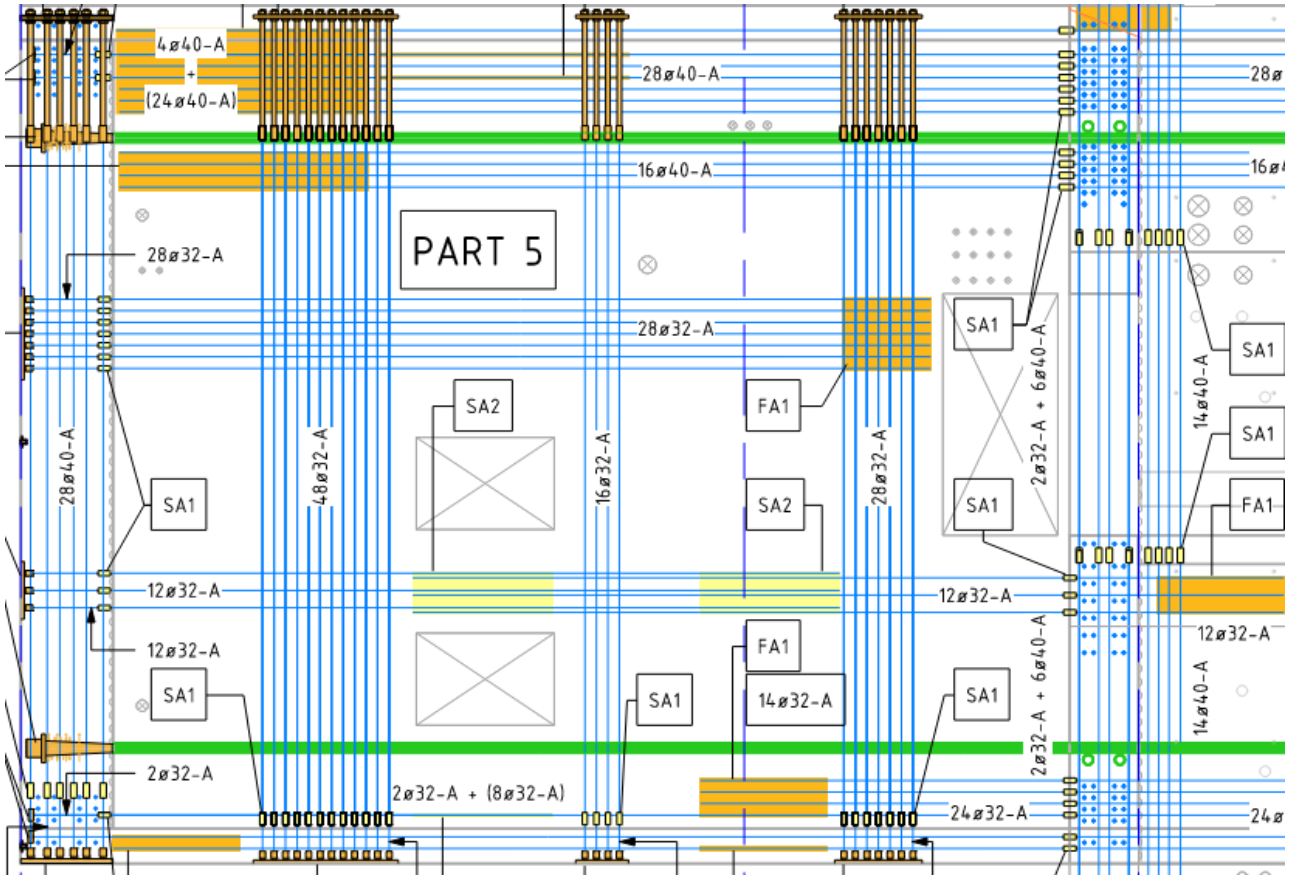
PL1000x600x30, S355N-Z35. COUNT: 4
ANCHORING UPPER HORIZONTAL REINFORCEMENT OF OUTRIGGER IN BELT WALL

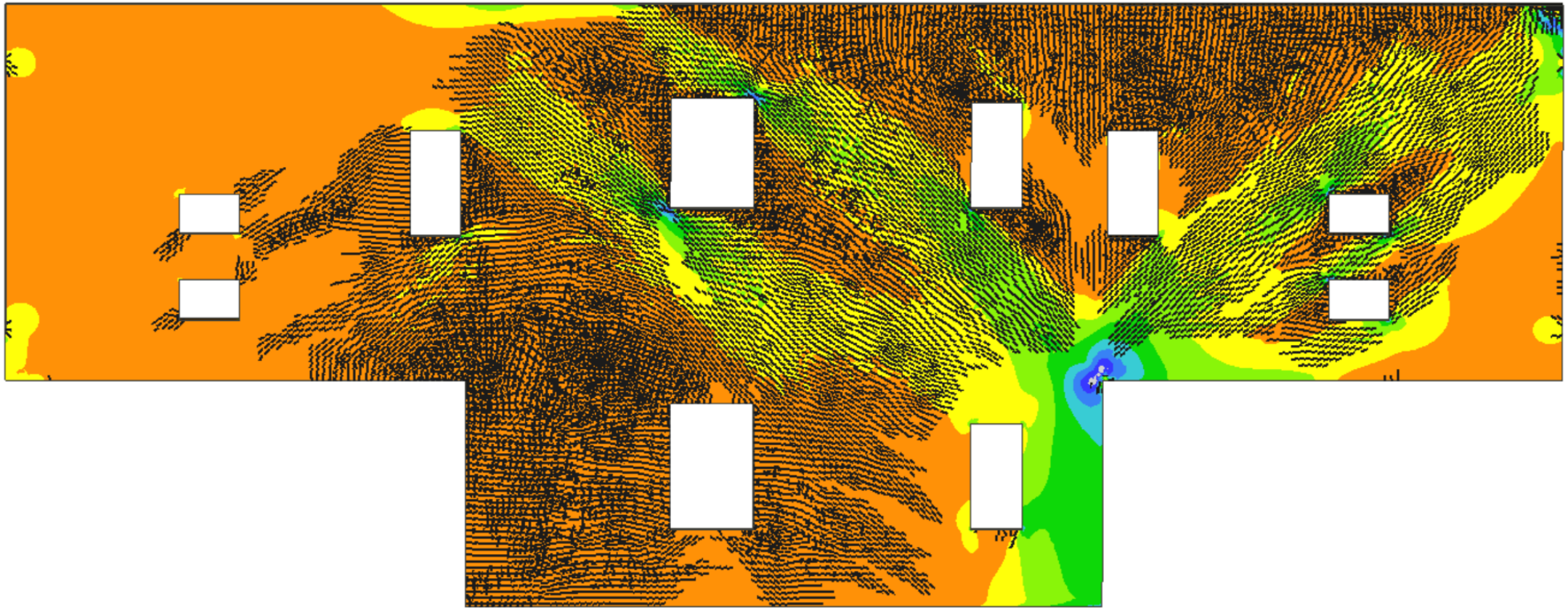


SECTION 1 : 10

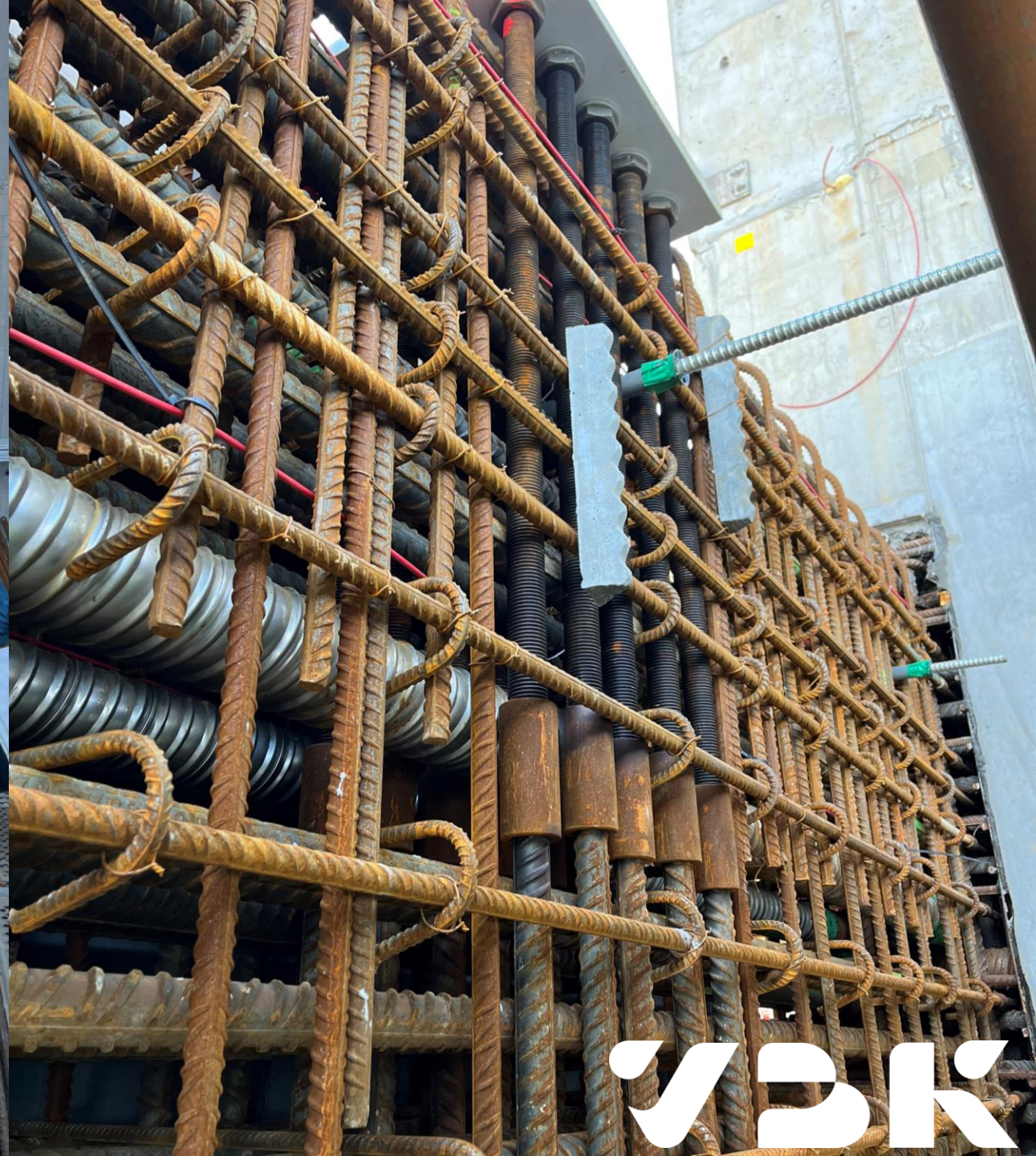
GENERAL DIRECTION ON COUPLER WELDING AT CAST-IN PLATE



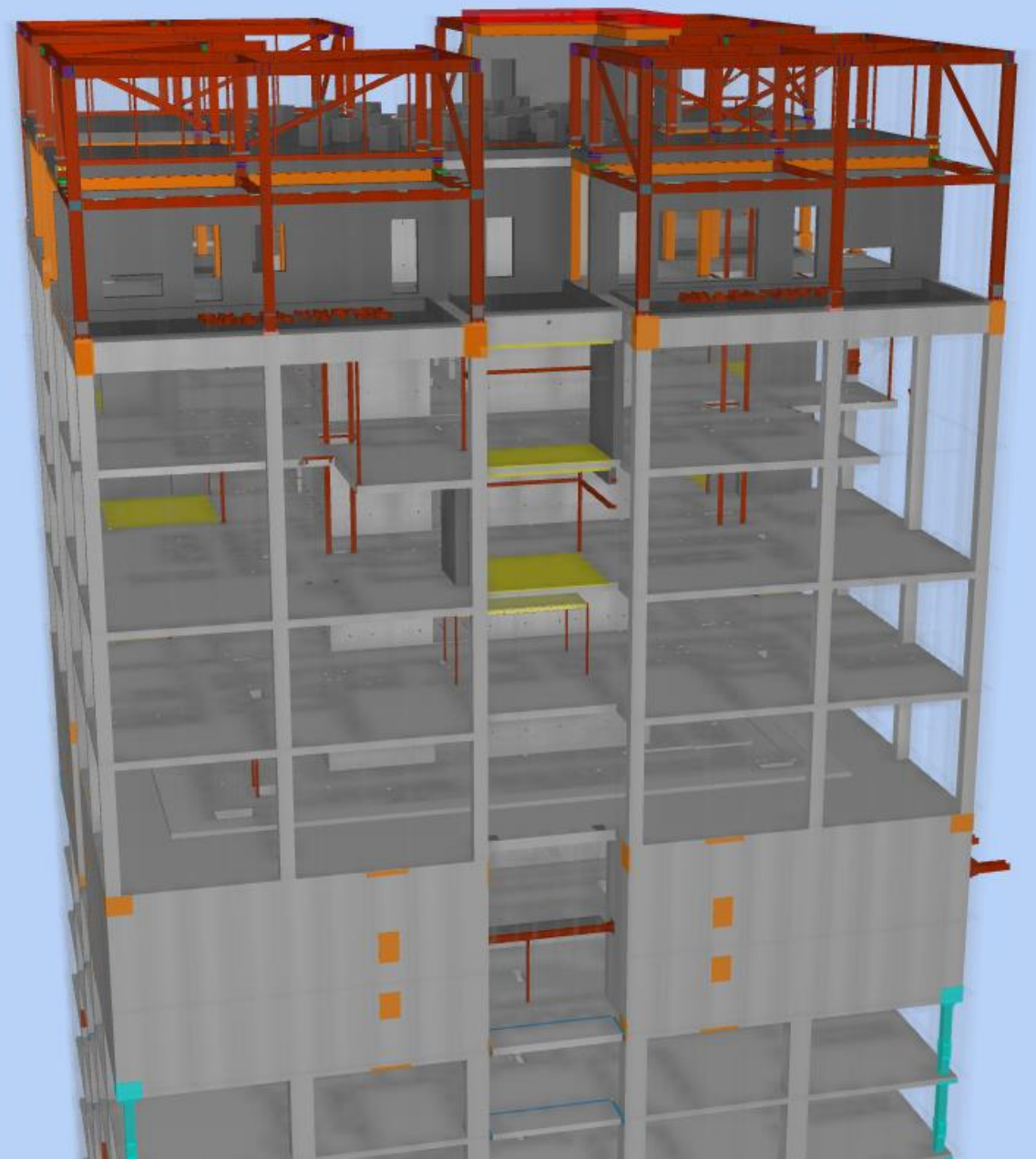





Layher

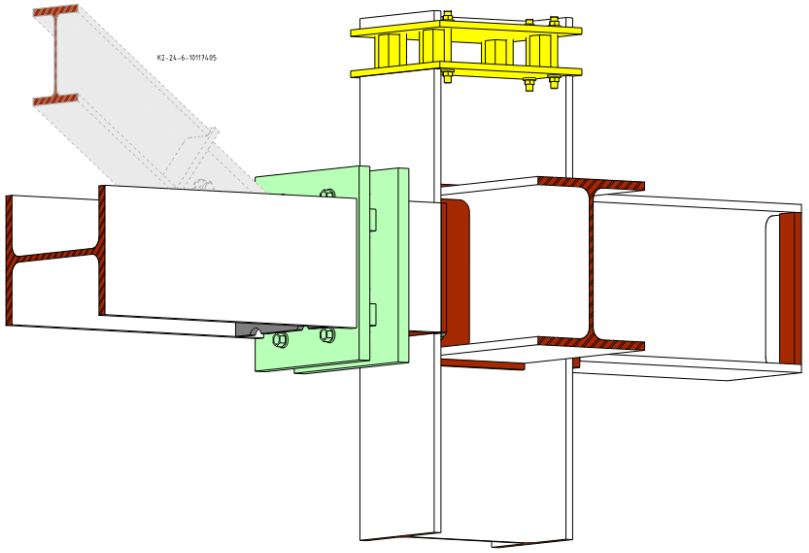


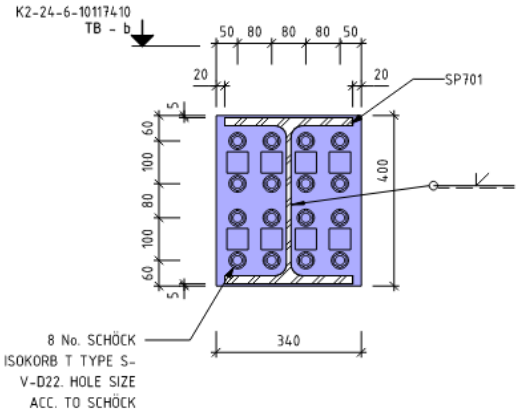
Kronan på verket

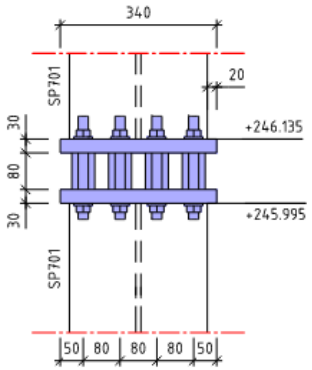


UTMANINGAR

- Höga vindlaster vs deformationskrav fasad
- Köldbryggor
- Servicekran behöver utrymme
- Montage 250 m upp i luften
- Brandskydd exponerat stål







THERMAL BREAK (TB5) 1 : 10

PRINCIPLE - COLUMN TO COLUMN. CROWN 12-15

Stålbyggnadsdagen 2024

johan.ornborg@vbk.se