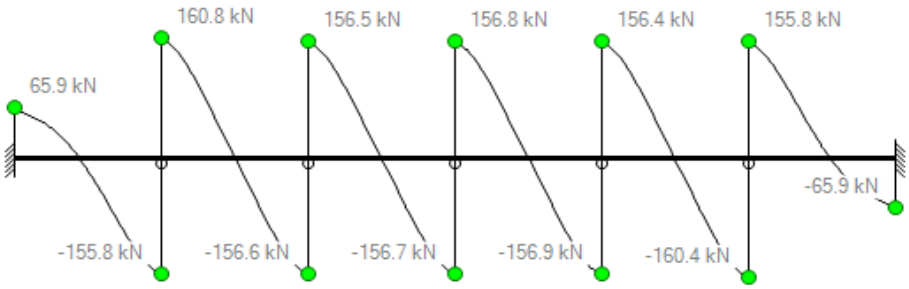
BEAM 1 (225 x 450)

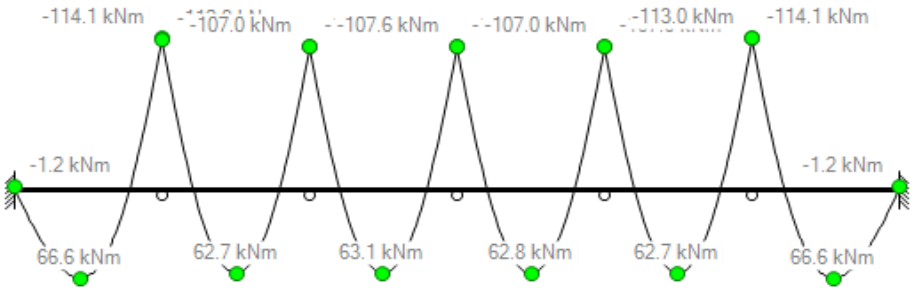
Shear Force Diagram, First-order linear, Strength Factors

Major



Bending Moment Diagram, First-order linear, Strength Factors

Major



Static

1B5 - 1 225x450 - Critical

Design summary bending top

Region	1	2	3
Analysis	FE Chase Down	3D Building Analysis	FE Chase Down
Combination	2	1	2
M_{Ed}	20.0 kNm	0.0 kNm	118.9 kNm
d	409.0 mm	409.0 mm	407.0 mm
d_2	41.0 mm	41.0 mm	41.0 mm
K / K'	**0.13**	**0.00**	**0.77**
z	388.6 mm	0.0 mm	338.0 mm
$A_{st,reqd}$	144 mm²	0 mm²	987 mm²
$A_{swa,reqd}$	0 mm²	0 mm²	0 mm²
$A_{slT,reqd}$	0 mm²	0 mm²	0 mm²
$A_{s2,reqd}$	0 mm²	0 mm²	0 mm²
$A_{stt,reqd}$	144 mm²	0 mm²	987 mm²

$A_{s,min}$	138 mm²	0 mm²	128 mm²
$A_{st,prov}$	402 mm²	402 mm²	1256 mm²
Top bars	2Y16	2Y16	4Y20

Design summary bending bottom

Region	1	2	3
Analysis	FE Chase Down	FE Chase Down	FE Chase Down
Combination	2	2	2
M_{Ed}	47.8 kNm	79.8 kNm	0.0 kNm
d	409.0 mm	409.0 mm	409.0 mm
d_2	41.0 mm	43.0 mm	43.0 mm
K / K'	**0.31**	**0.51**	**0.00**
z	384.7 mm	366.3 mm	0.0 mm
$A_{st,reqd}$	348 mm²	611 mm²	0 mm²
$A_{swa,reqd}$	234 mm²	0 mm²	576 mm²
$A_{slT,reqd}$	0 mm²	0 mm²	0 mm²
$A_{s2,reqd}$	0 mm²	0 mm²	0 mm²
$A_{stt,reqd}$	582 mm²	611 mm²	576 mm²
$A_{s,min}$	153 mm²	129 mm²	153 mm²
$A_{st,prov}$	804 mm²	804 mm²	804 mm²
Bottom bars	4Y16	4Y16	4Y16
Deflection check	-	L / d = 9.169 < 32.354	-

Design summary shear and torsion

Region	Center
Length	3.750 m
Analysis	FE Chase Down
Combination	2
V_{Ed}	157.6 kN
$V_{Rd,max}$	303.3 kN
$V_{Rd,c}$	31.8 kN
$A_{sws,reqd}$	483 mm²/m
$A_{sw,min,reqd}$	196 mm²/m
$A_{sw,prov}$	500 mm²/m
T_{Ed}	0.00 kNm
$T_{Rd,max}$	32.03 kNm
$T_{Rd,c}$	8.98 kNm
$A_{swt,reqd}$	0 mm²/m
Stirrups	2Y8-200

1B5 - 2 225x450 - Critical

Design summary bending top

Region	1	2	3
Analysis	FE Chase Down	3D Building Analysis	3D Building Analysis
Combination	2	1	2
M_{Ed}	117.2 kNm	0.0 kNm	107.0 kNm
d	407.0 mm	409.0 mm	407.0 mm
d_2	41.0 mm	41.0 mm	41.0 mm
K / K'	**0.76**	**0.00**	**0.69**
z	339.2 mm	0.0 mm	346.5 mm
$A_{st,reqd}$	969 mm²	0 mm²	866 mm²
$A_{swa,reqd}$	0 mm²	0 mm²	0 mm²
$A_{slT,reqd}$	0 mm²	0 mm²	0 mm²
$A_{s2,reqd}$	0 mm²	0 mm²	0 mm²
$A_{stt,reqd}$	969 mm²	0 mm²	866 mm²
$A_{s,min}$	128 mm²	0 mm²	128 mm²
$A_{st,prov}$	1256 mm²	402 mm²	942 mm²
Top bars	4Y20	2Y16	3Y20

Design summary bending bottom

Region	1	2	3
Analysis	3D Building Analysis	3D Building Analysis	3D Building Analysis
Combination	2	2	2
M_{Ed}	0.0 kNm	62.7 kNm	0.0 kNm
d	409.0 mm	409.0 mm	409.0 mm
d_2	43.0 mm	43.0 mm	43.0 mm
K / K'	**0.00**	**0.40**	**0.00**
z	0.0 mm	376.4 mm	0.0 mm
$A_{st,reqd}$	0 mm²	467 mm²	0 mm²
$A_{swa,reqd}$	452 mm²	0 mm²	452 mm²
$A_{slT,reqd}$	0 mm²	0 mm²	0 mm²
$A_{s2,reqd}$	0 mm²	0 mm²	0 mm²
$A_{stt,reqd}$	452 mm²	467 mm²	452 mm²
$A_{s,min}$	129 mm²	129 mm²	129 mm²
$A_{st,prov}$	603 mm²	603 mm²	603 mm²
Bottom bars	3Y16	3Y16	3Y16
Deflection check	-	L / d = 9.169 < 39.948	-

Design summary shear and torsion

Region	Left	Center	Right
Length	0.938 m	1.875 m	0.938 m
Analysis	FE Chase Down	3D Building Analysis	3D Building Analysis
Combination	2	2	2

V_{Ed}	147.4 kN	99.6 kN	140.3 kN
$V_{Rd,max}$	303.3 kN	303.3 kN	303.3 kN
$V_{Rd,c}$	31.8 kN	31.8 kN	31.8 kN
$A_{sws,reqd}$	452 mm²/m	304 mm²/m	430 mm²/m
$A_{sw,min,reqd}$	196 mm²/m	196 mm²/m	196 mm²/m
$A_{sw,prov}$	500 mm²/m	500 mm²/m	500 mm²/m
T_{Ed}	0.00 kNm	0.00 kNm	0.00 kNm
$T_{Rd,max}$	32.03 kNm	32.03 kNm	32.03 kNm
$T_{Rd,c}$	8.98 kNm	8.98 kNm	8.98 kNm
$A_{swt,reqd}$	0 mm²/m	0 mm²/m	0 mm²/m
Stirrups	2Y8-200	2Y8-200	2Y8-200

1B5 - 3 225x450 - Critical

Design summary bending top

Region	1	2	3
Analysis	3D Building Analysis	3D Building Analysis	3D Building Analysis
Combination	2	1	2
M_{Ed}	107.0 kNm	0.0 kNm	107.6 kNm
d	407.0 mm	409.0 mm	407.0 mm
d_2	41.0 mm	41.0 mm	41.0 mm
K / K'	**0.69**	**0.00**	**0.70**
z	346.4 mm	0.0 mm	346.0 mm
$A_{st,reqd}$	866 mm²	0 mm²	872 mm²
$A_{swa,reqd}$	0 mm²	0 mm²	0 mm²
$A_{slT,reqd}$	0 mm²	0 mm²	0 mm²
$A_{s2,reqd}$	0 mm²	0 mm²	0 mm²
$A_{stt,reqd}$	866 mm²	0 mm²	872 mm²
$A_{s,min}$	128 mm²	0 mm²	128 mm²
$A_{st,prov}$	942 mm²	402 mm²	942 mm²
Top bars	3Y20	2Y16	3Y20

Design summary bending bottom

Region	1	2	3
Analysis	3D Building Analysis	3D Building Analysis	3D Building Analysis
Combination	2	2	2
M_{Ed}	0.0 kNm	63.1 kNm	0.0 kNm
d	409.0 mm	409.0 mm	409.0 mm
d_2	43.0 mm	43.0 mm	43.0 mm
K / K'	**0.00**	**0.41**	**0.00**
z	0.0 mm	376.1 mm	0.0 mm
$A_{st,reqd}$	0 mm²	470 mm²	0 mm²
$A_{swa,reqd}$	455 mm²	0 mm²	455 mm²

$A_{slT,reqd}$	0 mm²	0 mm²	0 mm²
$A_{s2,reqd}$	0 mm²	0 mm²	0 mm²
$A_{stt,reqd}$	455 mm²	470 mm²	455 mm²
$A_{s,min}$	129 mm²	129 mm²	129 mm²
$A_{st,prov}$	603 mm²	603 mm²	603 mm²
Bottom bars	3Y16	3Y16	3Y16
Deflection check	-	L / d = 9.169 < 39.569	-

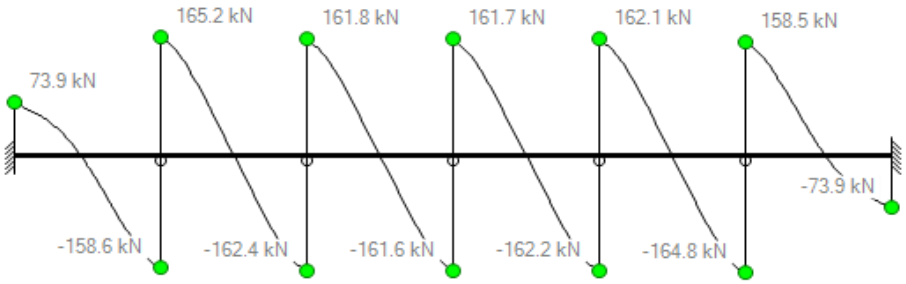
Design summary shear and torsion

Region	Left	Center	Right
Length	0.938 m	1.875 m	0.938 m
Analysis	3D Building	3D Building	FE Chase
Combinati	2	2	2
V_{Ed}	140.3 kN	96.8 kN	140.8 kN
$V_{Rd,max}$	303.3 kN	303.3 kN	303.3 kN
$V_{Rd,c}$	31.8 kN	31.8 kN	31.8 kN
$A_{sws,reqd}$	430 mm²/m	295 mm²/m	431 mm²/m
$A_{sw,min,reqd}$	196 mm²/m	196 mm²/m	196 mm²/m
$A_{sw,prov}$	500 mm²/m	500 mm²/m	500 mm²/m
T_{Ed}	0.00 kNm	0.00 kNm	0.00 kNm
$T_{Rd,max}$	32.03 kNm	32.03 kNm	32.03 kNm
$T_{Rd,c}$	8.98 kNm	8.98 kNm	8.98 kNm
$A_{swt,reqd}$	0 mm²/m	0 mm²/m	0 mm²/m
Stirrups	2Y8-200	2Y8-200	2Y8-200

BEAM 1 (950 x 200)

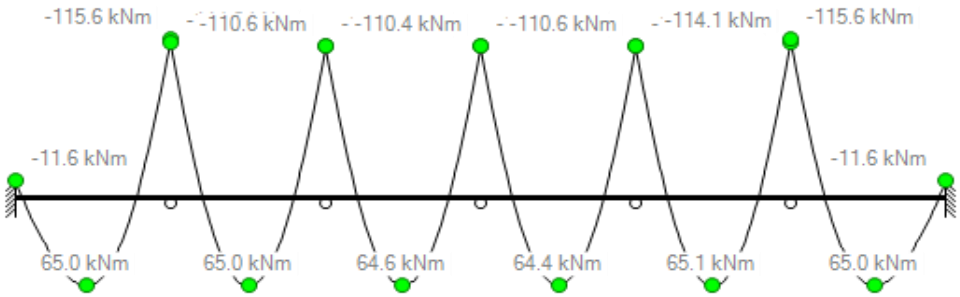
Shear Force Diagram, First-order linear, Strength Factors

Major



Bending Moment Diagram, First-order linear, Strength Factors

Major



1B5 - 1 950x200 - Critical

Design summary bending top

Region	1	2	3
Analysis	3D Building Analysis	3D Building Analysis	3D Building Analysis
Combination	2	1	2
M_{Ed}	16.2 kNm	0.0 kNm	115.6 kNm
d	159.0 mm	159.0 mm	159.0 mm
d_2	41.0 mm	41.0 mm	41.0 mm
K / K'	**0.16**	**0.00**	**1.16**
z	151.1 mm	0.0 mm	120.8 mm
$A_{st,reqd}$	302 mm²	0 mm²	2693 mm²
$A_{swa,reqd}$	0 mm²	0 mm²	0 mm²
$A_{slT,reqd}$	0 mm²	0 mm²	0 mm²
$A_{s2,reqd}$	0 mm²	0 mm²	388 mm²
$A_{stt,reqd}$	302 mm²	0 mm²	2693 mm²

$A_{s,min}$	260 mm²	0 mm²	231 mm²
$A_{st,prov}$	1809 mm²	1809 mm²	2814 mm²
Top bars	9Y16	9Y16	14Y16

Design summary bending bottom

Region	1	2	3
Analysis	FE Chase Down	3D Building Analysis	3D Building Analysis
Combination	2	2	2
M_{Ed}	29.9 kNm	65.0 kNm	0.0 kNm
d	159.0 mm	159.0 mm	159.0 mm
d_2	41.0 mm	41.0 mm	41.0 mm
K / K'	**0.30**	**0.65**	**0.00**
z	149.7 mm	137.0 mm	0.0 mm
$A_{st,reqd}$	560 mm²	1330 mm²	0 mm²
$A_{swa,reqd}$	220 mm²	0 mm²	556 mm²
$A_{slT,reqd}$	0 mm²	0 mm²	0 mm²
$A_{s2,reqd}$	0 mm²	0 mm²	0 mm²
$A_{stt,reqd}$	780 mm²	1330 mm²	556 mm²
$A_{s,min}$	333 mm²	260 mm²	333 mm²
$A_{st,prov}$	1809 mm²	1809 mm²	1809 mm²
Bottom bars	9Y16	9Y16	9Y16
Deflection check	-	L / d = 23.585 < 31.055	-

Design summary shear and torsion

Region	Center
Length	3.750 m
Analysis	3D Building Analysis
Combination	2
V_{Ed}	154.0 kN
$V_{Rd,max}$	500.3 kN
$V_{Rd,c}$	66.9 kN
$A_{sws,reqd}$	1207 mm²/m
$A_{sw,min,reqd}$	829 mm²/m
$A_{sw,prov}$	4500 mm²/m
T_{Ed}	0.00 kNm
$T_{Rd,max}$	61.91 kNm
$T_{Rd,c}$	17.35 kNm
$A_{swt,reqd}$	0 mm²/m
Stirrups	9Y8-100

1B5 - 2 950x200 - Critical

Design summary bending top

Region	1	2	3

Analysis	3D Building Analysis	3D Building Analysis	3D Building Analysis
Combination	2	1	2
M_{Ed}	114.2 kNm	0.0 kNm	110.6 kNm
d	159.0 mm	159.0 mm	159.0 mm
d_2	41.0 mm	41.0 mm	41.0 mm
K / K'	**1.15**	**0.00**	**1.11**
z	120.8 mm	0.0 mm	120.8 mm
$A_{st,reqd}$	2658 mm²	0 mm²	2572 mm²
$A_{swa,reqd}$	0 mm²	0 mm²	0 mm²
$A_{slT,reqd}$	0 mm²	0 mm²	0 mm²
$A_{s2,reqd}$	354 mm²	0 mm²	268 mm²
$A_{stt,reqd}$	2658 mm²	0 mm²	2572 mm²
$A_{s,min}$	231 mm²	0 mm²	235 mm²
$A_{st,prov}$	2814 mm²	1809 mm²	2613 mm²
Top bars	14Y16	9Y16	13Y16

Design summary bending bottom

Region	**1**	**2**	**3**
Analysis	3D Building Analysis	3D Building Analysis	3D Building Analysis
Combination	2	2	2
M_{Ed}	0.0 kNm	65.0 kNm	0.0 kNm
d	159.0 mm	159.0 mm	159.0 mm
d_2	41.0 mm	41.0 mm	41.0 mm
K / K'	**0.00**	**0.65**	**0.00**
z	0.0 mm	137.0 mm	0.0 mm
$A_{st,reqd}$	0 mm²	1331 mm²	0 mm²
$A_{swa,reqd}$	579 mm²	0 mm²	569 mm²
$A_{slT,reqd}$	0 mm²	0 mm²	0 mm²
$A_{s2,reqd}$	0 mm²	0 mm²	0 mm²
$A_{stt,reqd}$	579 mm²	1331 mm²	569 mm²
$A_{s,min}$	333 mm²	260 mm²	333 mm²
$A_{st,prov}$	1809 mm²	1809 mm²	1809 mm²
Bottom bars	9Y16	9Y16	9Y16
Deflection check	-	L / d = 23.585 < 35.798	-

Design summary shear and torsion

Region	**Left**	**Center**	**Right**
Length	0.938 m	1.875 m	0.938 m
Analysis	3D Building Analysis	3D Building Analysis	3D Building Analysis
Combination	2	2	2
V_{Ed}	160.5 kN	101.5 kN	157.6 kN
$V_{Rd,max}$	500.3 kN	500.3 kN	500.3 kN
$V_{Rd,c}$	66.9 kN	66.9 kN	66.9 kN

$A_{sws,reqd}$	1258 mm²/m	796 mm²/m	1236 mm²/m
$A_{sw,min,reqd}$	829 mm²/m	829 mm²/m	829 mm²/m
$A_{sw,prov}$	4500 mm²/m	4500 mm²/m	4500 mm²/m
T_{Ed}	0.00 kNm	0.00 kNm	0.00 kNm
$T_{Rd,max}$	61.91 kNm	61.91 kNm	61.91 kNm
$T_{Rd,c}$	17.35 kNm	17.35 kNm	17.35 kNm
$A_{swt,reqd}$	0 mm²/m	0 mm²/m	0 mm²/m
Stirrups	9Y8-100	9Y8-100	9Y8-100

1B5 - 3 950x200 - Critical

Design summary bending top

Region	1	2	3
Analysis	3D Building Analysis	3D Building Analysis	3D Building Analysis
Combination	2	1	2
M_{Ed}	110.6 kNm	0.0 kNm	110.4 kNm
d	159.0 mm	159.0 mm	159.0 mm
d_2	41.0 mm	41.0 mm	41.0 mm
K / K'	**1.11**	**0.00**	**1.11**
z	120.8 mm	0.0 mm	120.8 mm
$A_{st,reqd}$	2573 mm²	0 mm²	2569 mm²
$A_{swa,reqd}$	0 mm²	0 mm²	0 mm²
$A_{slT,reqd}$	0 mm²	0 mm²	0 mm²
$A_{s2,reqd}$	268 mm²	0 mm²	264 mm²
$A_{stt,reqd}$	2573 mm²	0 mm²	2569 mm²
$A_{s,min}$	235 mm²	0 mm²	235 mm²
$A_{st,prov}$	2613 mm²	1809 mm²	2613 mm²
Top bars	13Y16	9Y16	13Y16

Design summary bending bottom

Region	1	2	3
Analysis	3D Building Analysis	3D Building Analysis	3D Building Analysis
Combination	2	2	2
M_{Ed}	0.0 kNm	64.6 kNm	0.0 kNm
d	159.0 mm	159.0 mm	159.0 mm
d_2	41.0 mm	41.0 mm	41.0 mm
K / K'	**0.00**	**0.65**	**0.00**
z	0.0 mm	137.1 mm	0.0 mm
$A_{st,reqd}$	0 mm²	1322 mm²	0 mm²
$A_{swa,reqd}$	567 mm²	0 mm²	567 mm²
$A_{slT,reqd}$	0 mm²	0 mm²	0 mm²
$A_{s2,reqd}$	0 mm²	0 mm²	0 mm²
$A_{stt,reqd}$	567 mm²	1322 mm²	567 mm²

$A_{s,min}$	331 mm²	260 mm²	331 mm²
$A_{st,prov}$	1809 mm²	1809 mm²	1809 mm²
Bottom bars	9Y16	9Y16	9Y16
Deflection check	-	L / d = 23.585 < 36.100	-

Design summary shear and torsion

Region	Left	Center	Right
Length	0.938 m	1.875 m	0.938 m
Analysis	3D Building Analysis	3D Building Analysis	3D Building Analysis
Combination	2	2	2
V_{Ed}	157.1 kN	99.3 kN	156.9 kN
$V_{Rd,max}$	500.3 kN	500.3 kN	500.3 kN
$V_{Rd,c}$	66.9 kN	66.9 kN	66.9 kN
$A_{sws,reqd}$	1232 mm²/m	779 mm²/m	1230 mm²/m
$A_{sw,min,reqd}$	829 mm²/m	829 mm²/m	829 mm²/m
$A_{sw,prov}$	4500 mm²/m	4500 mm²/m	4500 mm²/m
T_{Ed}	0.00 kNm	0.00 kNm	0.00 kNm
$T_{Rd,max}$	61.91 kNm	61.91 kNm	61.91 kNm
$T_{Rd,c}$	17.35 kNm	17.35 kNm	17.35 kNm
$A_{swt,reqd}$	0 mm²/m	0 mm²/m	0 mm²/m
Stirrups	9Y8-100	9Y8-100	9Y8-100