

BS387Frame**Nodal points**

Node	x [m]	y[m]
1	0.000	0.000
2	0.000	8.000
3	0.000	14.000
4	12.000	18.000
5	24.000	14.000
6	24.000	8.000
7	24.000	0.000
8	12.000	8.000
9	12.000	4.000
10	12.000	0.000

Supports

Node	kind	ux [mm]	uy [mm]	ur [rad]
1	fixed	ux=uy=ur=0		
7	fixed	ux=uy=ur=0		
10	fixed	ux=uy=ur=0		

Materials

Material : Concrete, E= 26.000 [GPa]

Weight density : $\rho = 25.000$ [kN/m³]

The element self weight is included in loads and masses

Element cross sections

Cr.sec.	b[cm]	h[cm]	b1[cm]	h1[cm]	Ac[cm ²]	Ic[cm ⁴]
1	30.000	60.000			1.80000E+003	5.40000E+005
2	30.000	60.000			1.80000E+003	5.40000E+005
3	30.000	100.000	120.000	15.000	4.35000E+003	4.20699E+006
4	25.000	50.000	120.000	15.000	2.67500E+003	4.91064E+005
5	30.000	40.000			1.20000E+003	1.60000E+005

Elements

Element	node 1	node 2	material	length(m)	angle(°)
1	1	2	1	8.000	90.000
2	2	3	2	6.000	90.000
3	3	4	3	12.649	18.435
4	4	5	3	12.649	341.565
5	5	6	2	6.000	270.000
6	6	7	1	8.000	270.000
7	2	8	4	12.000	0.000
8	8	6	4	12.000	0.000
9	8	9	5	4.000	270.000
10	9	10	5	4.000	270.000

Element distributed loads (yg=1.35, yg=1.50)

element	G[kN/m]	Q[kN/m]	ygG+ygQ[kN/m]	load kind	load direction
3	20.000	0.000	27.000	uniform	horizontal

Element distributed loads due to self weight (yg=1.35, yg=1.50)

element	G[kN/m]	Q[kN/m]	ygG+ygQ[kN/m]	load kind	load direction
1	4.500	0.000	6.075	uniform	vertical
2	4.500	0.000	6.075	uniform	vertical
3	10.875	0.000	14.681	uniform	vertical
4	10.875	0.000	14.681	uniform	vertical
5	4.500	0.000	6.075	uniform	vertical
6	4.500	0.000	6.075	uniform	vertical
7	6.687	0.000	9.027	uniform	vertical
8	6.687	0.000	9.027	uniform	vertical
9	3.000	0.000	4.050	uniform	vertical
10	3.000	0.000	4.050	uniform	vertical

Element distributed masses due to self weight (yg=1.00, yq=0.30)

element	Mg [kN/m]	Mq [kN/m]	ygMg+yqMq [kN/m]
1	4.500	0.000	4.500
2	4.500	0.000	4.500
3	10.875	0.000	10.875
4	10.875	0.000	10.875
5	4.500	0.000	4.500
6	4.500	0.000	4.500
7	6.687	0.000	6.687
8	6.687	0.000	6.687
9	3.000	0.000	3.000
10	3.000	0.000	3.000

Nodal displacements

Node	ux [mm]	uy [mm]	ur [rad]
1	0.000	0.000	0.00000
2	90.864	-0.260	0.01286
3	157.316	-0.405	0.00532
4	163.273	-18.540	-0.00174
5	168.721	-1.156	0.00120
6	91.158	-0.778	0.01403
7	0.000	0.000	0.00000
8	90.927	-0.304	-0.00203
9	47.493	-0.163	0.01756
10	0.000	0.000	0.00000

Nodal reactions

Node	Fx [kN]	Fy [kN]	M [kNm]
1	-129.722	176.316	-744.593
7	-115.235	479.388	-707.247
10	-96.569	134.864	-375.722

Internal forces at beam ends (global system)

element	FxA [kN]	FyA [kN]	MA [kNm]	FxB [kN]	FyB [kN]	MB [kNm]
1	-129.722	176.316	-744.593	129.722	-127.716	-293.187
2	-92.971	131.133	-102.395	92.971	-94.683	-455.433
3	-92.962	94.687	455.433	-248.564	91.018	-166.232
4	248.560	-91.016	166.232	-248.560	276.721	1046.038
5	248.555	-276.727	-1046.038	-248.555	313.177	-445.290
6	115.235	-430.788	-214.633	-115.235	479.388	-707.247
7	-36.750	-3.417	395.582	36.750	111.746	295.393
8	-133.321	-9.282	101.433	133.321	117.611	659.923
9	96.569	-102.464	-396.827	-96.569	118.664	10.553
10	96.569	-118.664	-10.552	-96.569	134.864	-375.722

Internal forces at beam ends (local system)

element	fxA [kN]	fyA [kN]	mA [kNm]	fxB [kN]	fyB [kN]	mB [kNm]
1	176.316	129.722	-744.593	-127.716	-129.722	-293.187
2	131.133	92.971	-102.395	-94.683	-92.971	-455.433
3	-58.248	119.225	455.433	-207.027	164.950	-166.232
4	264.587	-7.744	166.232	-323.312	183.919	1046.038
5	276.727	248.555	-1046.038	-313.177	-248.555	-445.290
6	430.788	115.235	-214.633	-479.388	-115.235	-707.247
7	-36.750	-3.417	395.582	36.750	111.746	295.393
8	-133.321	-9.282	101.433	133.321	117.611	659.923
9	102.464	96.569	-396.827	-118.664	-96.569	10.553
10	118.664	96.569	-10.552	-134.864	-96.569	-375.722

Diagrams of internal forces M, V, N, of element 1

n	x/l	x [m]	M [kNm]	V [kN]	N [kN]
0	0.000	0.00	-744.59	-129.72	-176.32
1	0.100	0.80	-640.81	-129.72	-171.46
2	0.200	1.60	-537.04	-129.72	-166.60
3	0.300	2.40	-433.26	-129.72	-161.74
4	0.400	3.20	-329.48	-129.72	-156.88
5	0.500	4.00	-225.70	-129.72	-152.02
6	0.600	4.80	-121.92	-129.72	-147.16
7	0.700	5.60	-18.15	-129.72	-142.30

8	0.800	6.40	85.63	-129.72	-137.44
9	0.900	7.20	189.41	-129.72	-132.58
10	1.000	8.00	293.19	-129.72	-127.72

Maximum values for element 1

maxM=	293.19 kNm,	minM=	-744.59 kNm
maxV=	-129.72 kN,	minV=	-129.72 kN
maxN=	-127.72 kN,	minN=	-176.32 kN

Diagrams of internal forces M, V, N, of element 2

n	x/l	x[m]	M[kNm]	V[kN]	N[kN]
0	0.000	0.00	-102.40	-92.97	-131.13
1	0.100	0.60	-46.61	-92.97	-127.49
2	0.200	1.20	9.17	-92.97	-123.84
3	0.300	1.80	64.95	-92.97	-120.20
4	0.400	2.40	120.74	-92.97	-116.55
5	0.500	3.00	176.52	-92.97	-112.91
6	0.600	3.60	232.30	-92.97	-109.26
7	0.700	4.20	288.08	-92.97	-105.62
8	0.800	4.80	343.87	-92.97	-101.97
9	0.900	5.40	399.65	-92.97	-98.33
10	1.000	6.00	455.43	-92.97	-94.68

Maximum values for element 2

maxM=	455.43 kNm,	minM=	-102.40 kNm
maxV=	-92.97 kN,	minV=	-92.97 kN
maxN=	-94.68 kN,	minN=	-131.13 kN

Diagrams of internal forces M, V, N, of element 3

n	x/l	x[m]	M[kNm]	V[kN]	N[kN]
0	0.000	0.00	455.43	-119.23	58.25
1	0.100	1.26	588.27	-90.81	31.72
2	0.200	2.53	685.16	-62.39	5.19
3	0.300	3.79	746.10	-33.97	-21.33
4	0.400	5.06	771.10	-5.56	-47.86
5	0.500	6.32	760.16	22.86	-74.39
6	0.600	7.59	713.27	51.28	-100.92
7	0.700	8.85	630.43	79.70	-127.44
8	0.800	10.12	511.65	108.11	-153.97
9	0.900	11.38	356.92	136.53	-180.50
10	1.000	12.65	166.24	164.95	-207.03

Maximum values for element 3

maxM=	771.10 kNm,	minM=	166.24 kNm
maxV=	164.95 kN,	minV=	-119.23 kN
maxN=	58.25 kN,	minN=	-207.03 kN

Diagrams of internal forces M, V, N, of element 4

n	x/l	x[m]	M[kNm]	V[kN]	N[kN]
0	0.000	0.00	166.23	7.74	-264.59
1	0.100	1.26	145.29	25.36	-270.46
2	0.200	2.53	102.07	42.98	-276.33
3	0.300	3.79	36.57	60.60	-282.20
4	0.400	5.06	-51.23	78.21	-288.08
5	0.500	6.32	-161.30	95.83	-293.95
6	0.600	7.59	-293.66	113.45	-299.82
7	0.700	8.85	-448.31	131.07	-305.69
8	0.800	10.12	-625.24	148.68	-311.57
9	0.900	11.38	-824.45	166.30	-317.44
10	1.000	12.65	-1045.95	183.92	-323.31

Maximum values for element 4

maxM=	166.23 kNm,	minM=	-1045.95 kNm
maxV=	183.92 kN,	minV=	7.74 kN
maxN=	-264.59 kN,	minN=	-323.31 kN

Diagrams of internal forces M, V, N, of element 5

n	x/l	x[m]	M[kNm]	V[kN]	N[kN]
0	0.000	0.00	-1046.04	-248.55	-276.73
1	0.100	0.60	-896.91	-248.55	-280.37
2	0.200	1.20	-747.77	-248.55	-284.02
3	0.300	1.80	-598.64	-248.55	-287.66
4	0.400	2.40	-449.51	-248.55	-291.31
5	0.500	3.00	-300.37	-248.55	-294.95
6	0.600	3.60	-151.24	-248.55	-298.60
7	0.700	4.20	-2.11	-248.55	-302.24
8	0.800	4.80	147.02	-248.55	-305.89
9	0.900	5.40	296.16	-248.55	-309.53
10	1.000	6.00	445.29	-248.55	-313.18

Maximum values for element 5

maxM= 445.29 kNm, minM= -1046.04 kNm
 maxV= -248.55 kN, minV= -248.55 kN
 maxN= -276.73 kN, minN= -313.18 kN

Diagrams of internal forces M, V, N, of element 6

n	x/l	x[m]	M[kNm]	V[kN]	N[kN]
0	0.000	0.00	-214.63	-115.23	-430.79
1	0.100	0.80	-122.44	-115.23	-435.65
2	0.200	1.60	-30.26	-115.23	-440.51
3	0.300	2.40	61.93	-115.23	-445.37
4	0.400	3.20	154.12	-115.23	-450.23
5	0.500	4.00	246.31	-115.23	-455.09
6	0.600	4.80	338.49	-115.23	-459.95
7	0.700	5.60	430.68	-115.23	-464.81
8	0.800	6.40	522.87	-115.23	-469.67
9	0.900	7.20	615.06	-115.23	-474.53
10	1.000	8.00	707.25	-115.23	-479.39

Maximum values for element 6

maxM= 707.25 kNm, minM= -214.63 kNm
 maxV= -115.23 kN, minV= -115.23 kN
 maxN= -430.79 kN, minN= -479.39 kN

Diagrams of internal forces M, V, N, of element 7

n	x/l	x[m]	M[kNm]	V[kN]	N[kN]
0	0.000	0.00	395.58	3.42	36.75
1	0.100	1.20	384.98	14.25	36.75
2	0.200	2.40	361.38	25.08	36.75
3	0.300	3.60	324.78	35.92	36.75
4	0.400	4.80	275.19	46.75	36.75
5	0.500	6.00	212.59	57.58	36.75
6	0.600	7.20	136.99	68.41	36.75
7	0.700	8.40	48.39	79.25	36.75
8	0.800	9.60	-53.20	90.08	36.75
9	0.900	10.80	-167.80	100.91	36.75
10	1.000	12.00	-295.39	111.75	36.75

Maximum values for element 7

maxM= 395.58 kNm, minM= -295.39 kNm
 maxV= 111.75 kN, minV= 3.42 kN
 maxN= 36.75 kN, minN= 36.75 kN

Diagrams of internal forces M, V, N, of element 8

n	x/l	x[m]	M[kNm]	V[kN]	N[kN]
0	0.000	0.00	101.43	9.28	133.32
1	0.100	1.20	83.80	20.11	133.32
2	0.200	2.40	53.16	30.95	133.32
3	0.300	3.60	9.52	41.78	133.32
4	0.400	4.80	-47.11	52.61	133.32
5	0.500	6.00	-116.75	63.45	133.32
6	0.600	7.20	-199.39	74.28	133.32
7	0.700	8.40	-295.02	85.11	133.32
8	0.800	9.60	-403.66	95.95	133.32
9	0.900	10.80	-525.29	106.78	133.32
10	1.000	12.00	-659.92	117.61	133.32

Maximum values for element 8

maxM= 101.43 kNm, minM= -659.92 kNm
 maxV= 117.61 kN, minV= 9.28 kN
 maxN= 133.32 kN, minN= 133.32 kN

Diagrams of internal forces M, V, N, of element 9

n	x/l	x[m]	M[kNm]	V[kN]	N[kN]
0	0.000	0.00	-396.83	-96.57	-102.46
1	0.100	0.40	-358.20	-96.57	-104.08
2	0.200	0.80	-319.57	-96.57	-105.70
3	0.300	1.20	-280.94	-96.57	-107.32
4	0.400	1.60	-242.32	-96.57	-108.94
5	0.500	2.00	-203.69	-96.57	-110.56
6	0.600	2.40	-165.06	-96.57	-112.18
7	0.700	2.80	-126.43	-96.57	-113.80
8	0.800	3.20	-87.81	-96.57	-115.42
9	0.900	3.60	-49.18	-96.57	-117.04
10	1.000	4.00	-10.55	-96.57	-118.66

Maximum values for element 9

maxM= -10.55 kNm, minM= -396.83 kNm
 maxV= -96.57 kN, minV= -96.57 kN
 maxN= -102.46 kN, minN= -118.66 kN

Diagrams of internal forces M, V, N, of element 10

n	x/l	x[m]	M[kNm]	V[kN]	N[kN]
0	0.000	0.00	-10.55	-96.57	-118.66
1	0.100	0.40	28.08	-96.57	-120.28
2	0.200	0.80	66.70	-96.57	-121.90
3	0.300	1.20	105.33	-96.57	-123.52
4	0.400	1.60	143.96	-96.57	-125.14
5	0.500	2.00	182.58	-96.57	-126.76
6	0.600	2.40	221.21	-96.57	-128.38
7	0.700	2.80	259.84	-96.57	-130.00
8	0.800	3.20	298.47	-96.57	-131.62
9	0.900	3.60	337.09	-96.57	-133.24
10	1.000	4.00	375.72	-96.57	-134.86

Maximum values for element 10

maxM= 375.72 kNm, minM= -10.55 kNm
 maxV= -96.57 kN, minV= -96.57 kN
 maxN= -118.66 kN, minN= -134.86 kN

Natural frequencies

No.	Frequency[Hz]	Period[sec]
1	1.18396	0.84462
2	4.58775	0.21797
3	5.31602	0.18811
4	9.08941	0.11002
5	11.94016	0.08375
6	17.56085	0.05694
7	19.41734	0.05150
8	20.87171	0.04791
9	28.51989	0.03506
10	34.23979	0.02921
11	42.48057	0.02354
12	51.65243	0.01936
13	57.60465	0.01736
14	67.57261	0.01480
15	70.33988	0.01422
16	75.59764	0.01323
17	110.53419	0.00905
18	118.85564	0.00841
19	138.18330	0.00724
20	149.44075	0.00669
21	230.14142	0.00435

Mode shapes**Mode shape, for natural frequency N=1, f=1.18396[Hz], T=0.84462[sec]**

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	0.09680	0.00024	0.01310
3	0.16045	0.00034	0.00237
4	0.16066	0.00000	-0.00103
5	0.16045	-0.00034	0.00237
6	0.09680	-0.00024	0.01310
7	0.00000	0.00000	0.00000
8	0.09675	0.00000	-0.00183
9	0.05042	0.00000	0.01859
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=2, f=4.58775[Hz], T=0.21797[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	0.00204	0.00292	0.01778
3	0.09930	0.00487	-0.02461
4	0.00000	0.30538	0.00000
5	-0.09930	0.00487	0.02461
6	-0.00204	0.00292	-0.01778
7	0.00000	0.00000	0.00000
8	0.00000	-0.00023	0.00000
9	0.00000	-0.00012	0.00000
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=3, f=5.31602[Hz], T=0.18811[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	0.18709	-0.00164	-0.01987
3	-0.08888	-0.00264	-0.01603
4	-0.09069	0.00000	0.00769
5	-0.08888	0.00264	-0.01603
6	0.18709	0.00164	-0.01987
7	0.00000	0.00000	0.00000
8	0.18863	0.00000	0.02355
9	0.07822	0.00000	0.02920
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=4, f=9.08941[Hz], T=0.11002[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	-0.02178	-0.00146	-0.04862
3	0.02990	-0.00020	0.01530
4	0.03053	0.00000	-0.01079
5	0.02990	0.00020	0.01530
6	-0.02178	0.00146	-0.04862
7	0.00000	0.00000	0.00000
8	-0.02197	0.00000	0.15992
9	-0.20562	0.00000	-0.04551
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=5, f=11.94016[Hz], T=0.08375[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	0.02430	0.01088	-0.00775
3	0.02283	0.01845	0.07400
4	0.02751	0.00000	-0.08225
5	0.02283	-0.01845	0.07400
6	0.02430	-0.01088	-0.00775
7	0.00000	0.00000	0.00000
8	0.02537	0.00000	-0.03063
9	0.06410	0.00000	0.01277
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=6, f=17.56085[Hz], T=0.05694[sec]

Node	ux [mm]	uy [mm]	ur [rad]
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1	0.00000	0.00000	0.00000
2	-0.00194	0.00298	-0.15321
3	-0.01568	0.01874	0.06686
4	0.00000	-0.01113	0.00000
5	0.01568	0.01874	-0.06686
6	0.00194	0.00298	0.15321
7	0.00000	0.00000	0.00000
8	0.00000	-0.03126	0.00000
9	0.00000	-0.01578	0.00000
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=7, f=19.41734[Hz], T=0.05150[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	-0.00438	0.05838	0.06471
3	-0.05841	0.08838	0.09336
4	0.00000	-0.06628	0.00000
5	0.05841	0.08838	-0.09336
6	0.00438	0.05838	-0.06471
7	0.00000	0.00000	0.00000
8	0.00000	0.02454	0.00000
9	0.00000	0.01242	0.00000
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=8, f=20.87171[Hz], T=0.04791[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	0.03199	0.00991	0.05364
3	-0.00570	0.01083	-0.00197
4	-0.00283	0.00000	-0.00282
5	-0.00570	-0.01083	-0.00197
6	0.03199	-0.00991	0.05364
7	0.00000	0.00000	0.00000
8	0.02664	0.00000	0.01939
9	-1.00690	0.00000	-0.00135
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=9, f=28.51989[Hz], T=0.03506[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	-0.01634	0.06656	0.19694
3	-0.02340	0.08289	-0.00719
4	0.00634	0.00000	0.01768
5	-0.02340	-0.08289	-0.00719
6	-0.01634	-0.06656	0.19694
7	0.00000	0.00000	0.00000
8	-0.01413	0.00000	0.21242
9	0.18133	0.00000	-0.07755
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=10, f=34.23979[Hz], T=0.02921[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	0.00935	0.11855	-0.10931
3	-0.07069	0.18927	0.05564
4	0.00871	0.00000	0.14402
5	-0.07069	-0.18927	0.05564
6	0.00935	-0.11855	-0.10931
7	0.00000	0.00000	0.00000
8	0.01134	0.00000	-0.06248
9	-0.02675	0.00000	0.02731
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=11, f=42.48057[Hz], T=0.02354[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	-0.00930	-0.04151	-0.08277
3	0.01940	-0.05135	0.02861
4	0.00000	-0.01179	0.00000
5	-0.01940	-0.05135	-0.02861
6	0.00930	-0.04151	0.08277
7	0.00000	0.00000	0.00000
8	0.00000	0.41036	0.00000
9	0.00000	0.21708	0.00000
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=12, f=51.65243[Hz], T=0.01936[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	-0.21785	0.14150	-0.07118
3	-0.07637	0.18187	-0.11894
4	0.00000	0.06559	0.00000
5	0.07637	0.18187	0.11894
6	0.21785	0.14150	0.07118
7	0.00000	0.00000	0.00000
8	0.00000	0.03917	0.00000
9	0.00000	0.02130	0.00000
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=13, f=57.60465[Hz], T=0.01736[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	0.22196	0.18620	-0.11611
3	-0.04610	0.23353	-0.13769
4	0.00000	0.03931	0.00000
5	0.04610	0.23353	0.13769
6	-0.22196	0.18620	0.11611
7	0.00000	0.00000	0.00000
8	0.00000	0.07672	0.00000
9	0.00000	0.04259	0.00000
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=14, f=67.57261[Hz], T=0.01480[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	0.00483	0.21766	-0.13118
3	-0.04660	0.22447	-0.24272
4	0.02071	0.00000	-0.15357
5	-0.04660	-0.22447	-0.24272
6	0.00483	-0.21766	-0.13118
7	0.00000	0.00000	0.00000
8	0.03997	0.00000	-0.04191
9	-0.00644	0.00000	0.09126
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=15, f=70.33988[Hz], T=0.01422[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	-0.06163	0.05539	-0.00169
3	0.27337	0.02966	0.05645
4	0.00000	-0.16472	0.00000
5	-0.27337	0.02966	-0.05645
6	0.06163	0.05539	0.00169
7	0.00000	0.00000	0.00000
8	0.00000	-0.02164	0.00000
9	0.00000	-0.01267	0.00000
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=16, f=75.59764[Hz], T=0.01323[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	0.01710	-0.00813	0.02436
3	0.00165	-0.00784	0.00872
4	-0.00034	0.00000	0.00531
5	0.00165	0.00784	0.00872
6	0.01710	0.00813	0.02436
7	0.00000	0.00000	0.00000
8	-0.01580	0.00000	0.03392
9	0.00029	0.00000	1.62791
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=17, f=110.53419[Hz], T=0.00905[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	-0.22899	-0.09764	0.04884
3	-0.08504	0.00106	0.00053
4	0.11908	0.00000	-0.00938
5	-0.08504	-0.00106	0.00053
6	-0.22899	0.09764	0.04884
7	0.00000	0.00000	0.00000
8	0.34683	0.00000	0.00815
9	-0.06975	0.00000	0.21368
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=18, f=118.85564[Hz], T=0.00841[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	0.13012	-0.13257	0.01449
3	-0.23035	0.11573	-0.10686
4	0.24812	0.00000	-0.07188
5	-0.23035	-0.11573	-0.10686
6	0.13012	0.13257	0.01449
7	0.00000	0.00000	0.00000
8	-0.16730	0.00000	-0.02387
9	0.03588	0.00000	-0.11129
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=19, f=138.18330[Hz], T=0.00724[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	0.00049	-0.29950	0.10084
3	-0.01338	0.32554	-0.13269
4	0.00000	0.00909	0.00000
5	0.01338	0.32554	0.13269
6	-0.00049	-0.29950	-0.10084
7	0.00000	0.00000	0.00000
8	0.00000	0.00290	0.00000
9	0.00000	0.00286	0.00000
10	0.00000	0.00000	0.00000

Mode shape, for natural frequency N=20, f=149.44075[Hz], T=0.00669[sec]

Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	0.00748	0.24430	-0.08201
3	-0.10392	-0.33586	0.14988
4	0.18309	0.00000	0.01598
5	-0.10392	0.33586	0.14988
6	0.00748	-0.24429	-0.08201
7	0.00000	0.00000	0.00000
8	-0.00690	0.00000	0.00442
9	0.00062	0.00000	-0.00072
10	0.00000	0.00000	0.00000

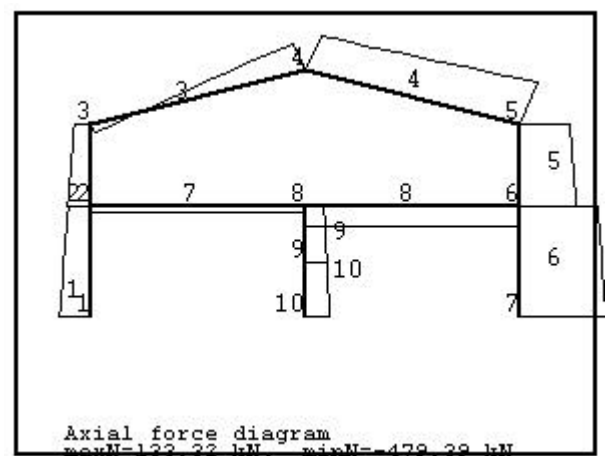
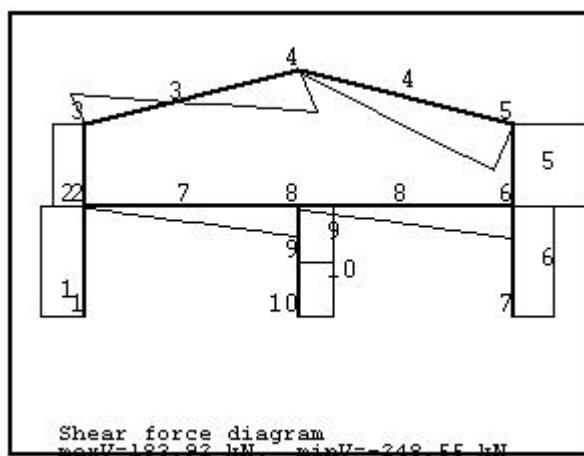
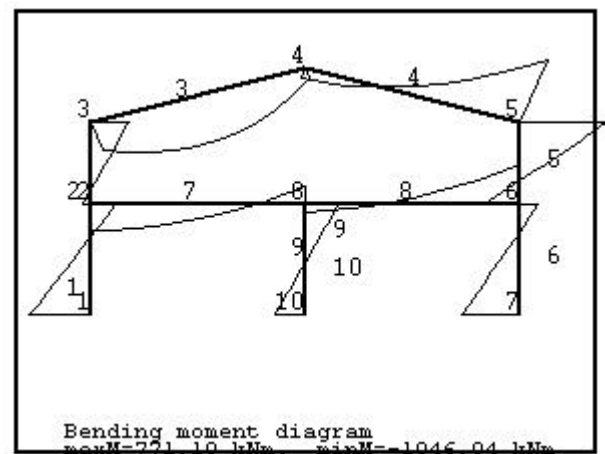
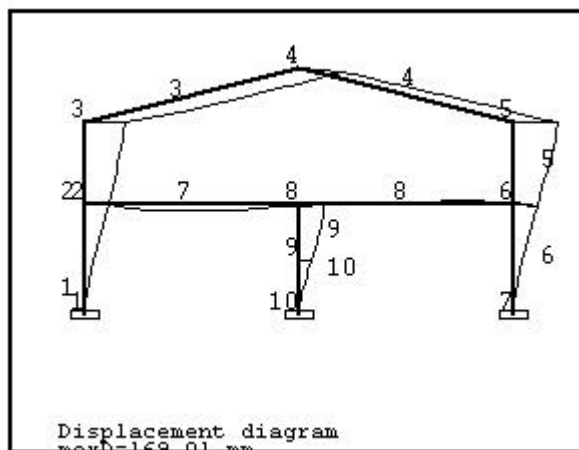
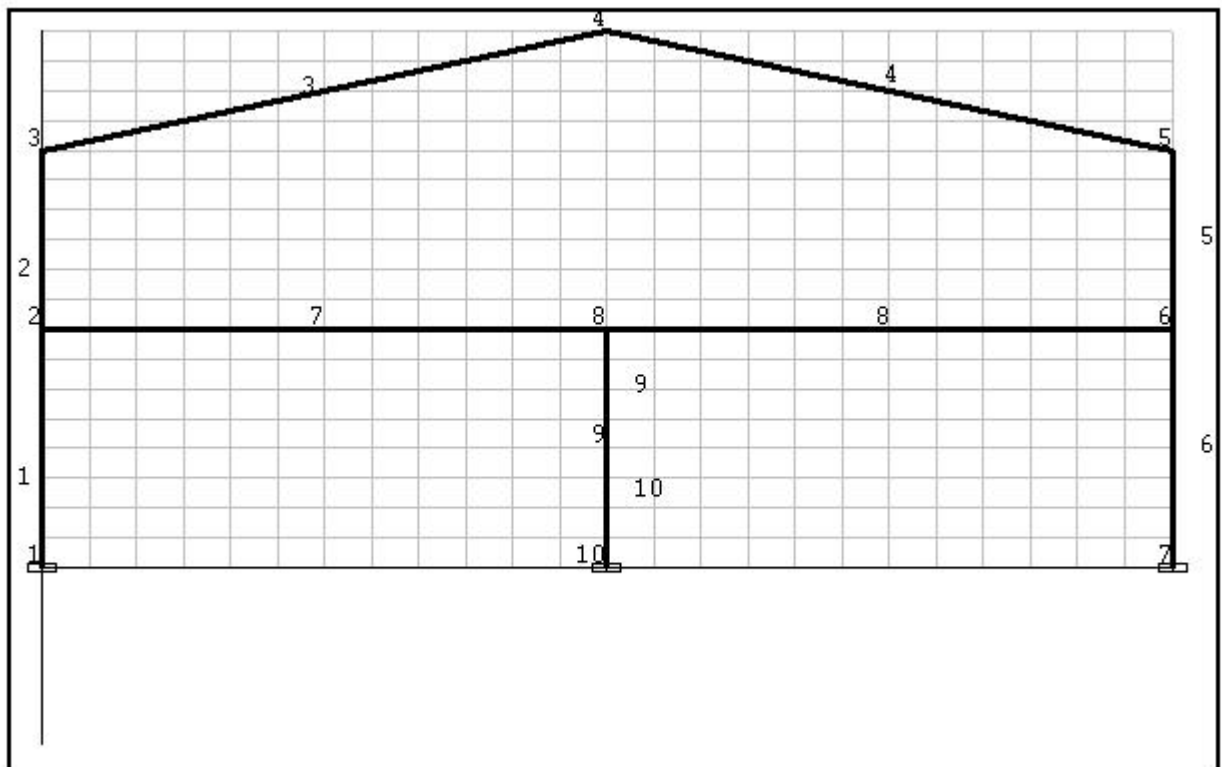
Mode shape, for natural frequency N=21, f=230.14142[Hz], T=0.00435[sec]

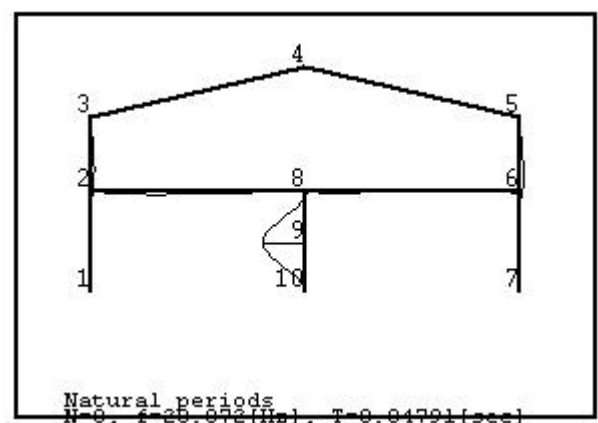
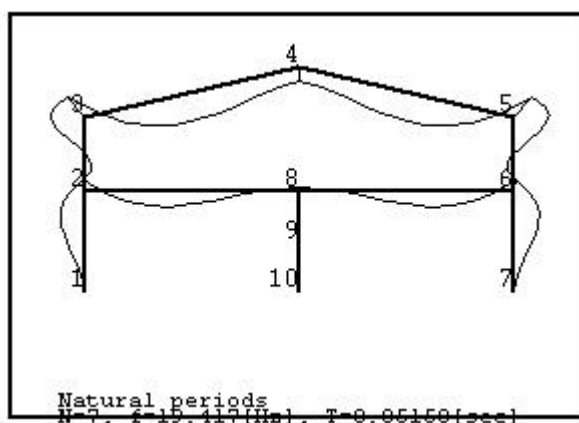
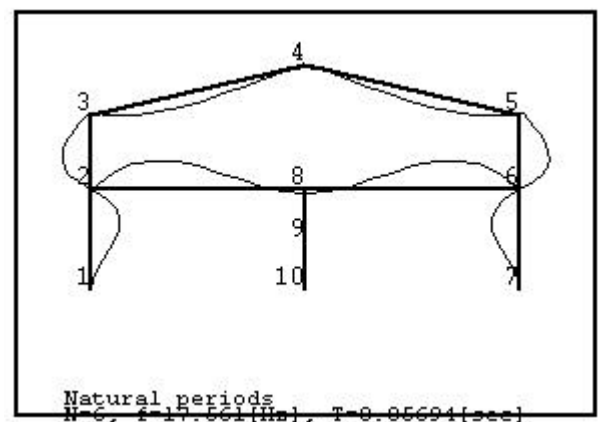
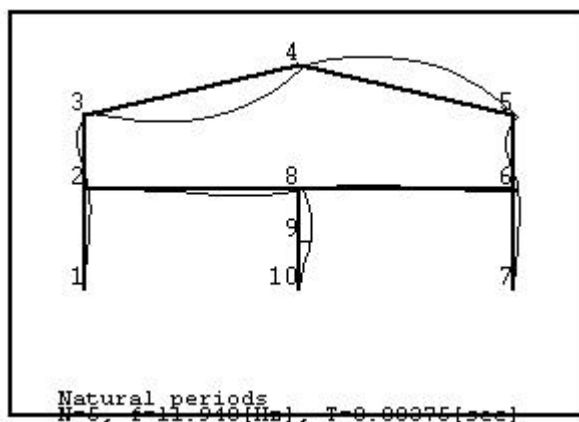
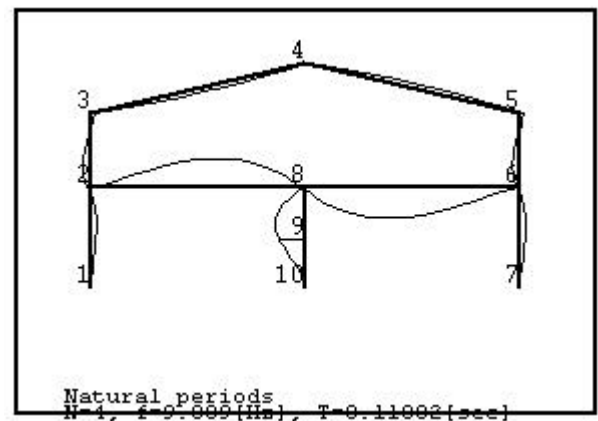
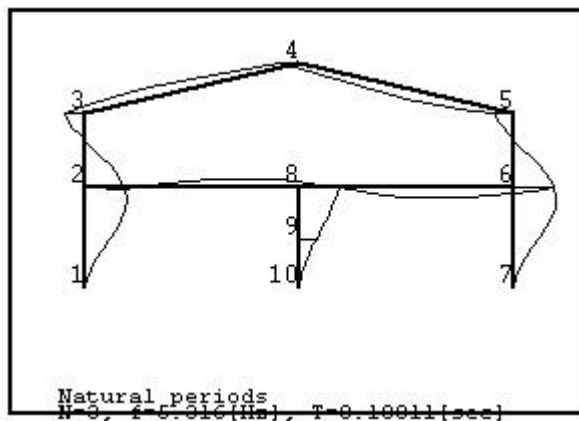
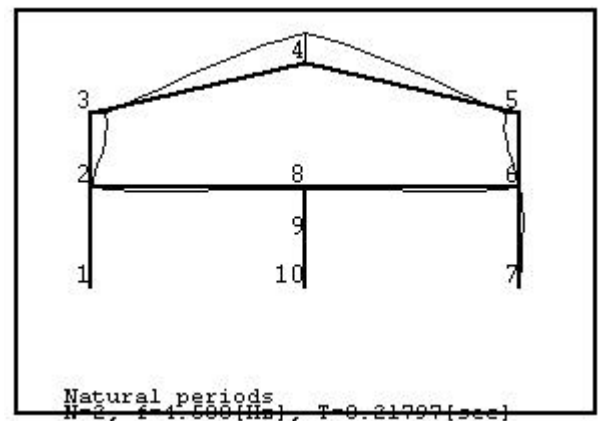
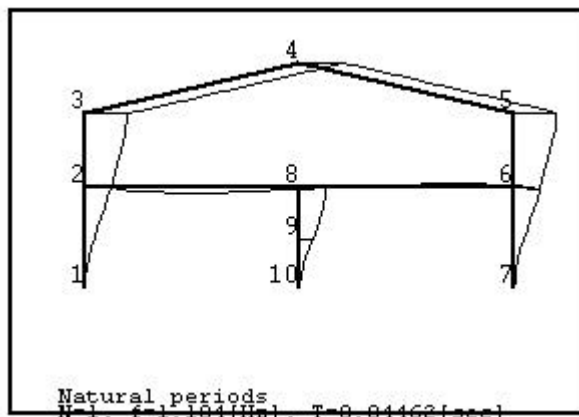
Node	ux [mm]	uy [mm]	ur [rad]
1	0.00000	0.00000	0.00000
2	-0.00477	-0.00148	0.02898
3	0.00448	-0.00519	0.00416
4	0.00000	-0.00254	0.00000
5	-0.00448	-0.00519	-0.00416
6	0.00477	-0.00148	-0.02898
7	0.00000	0.00000	0.00000
8	0.00000	-0.13120	0.00000
9	0.00000	1.09017	0.00000
10	0.00000	0.00000	0.00000

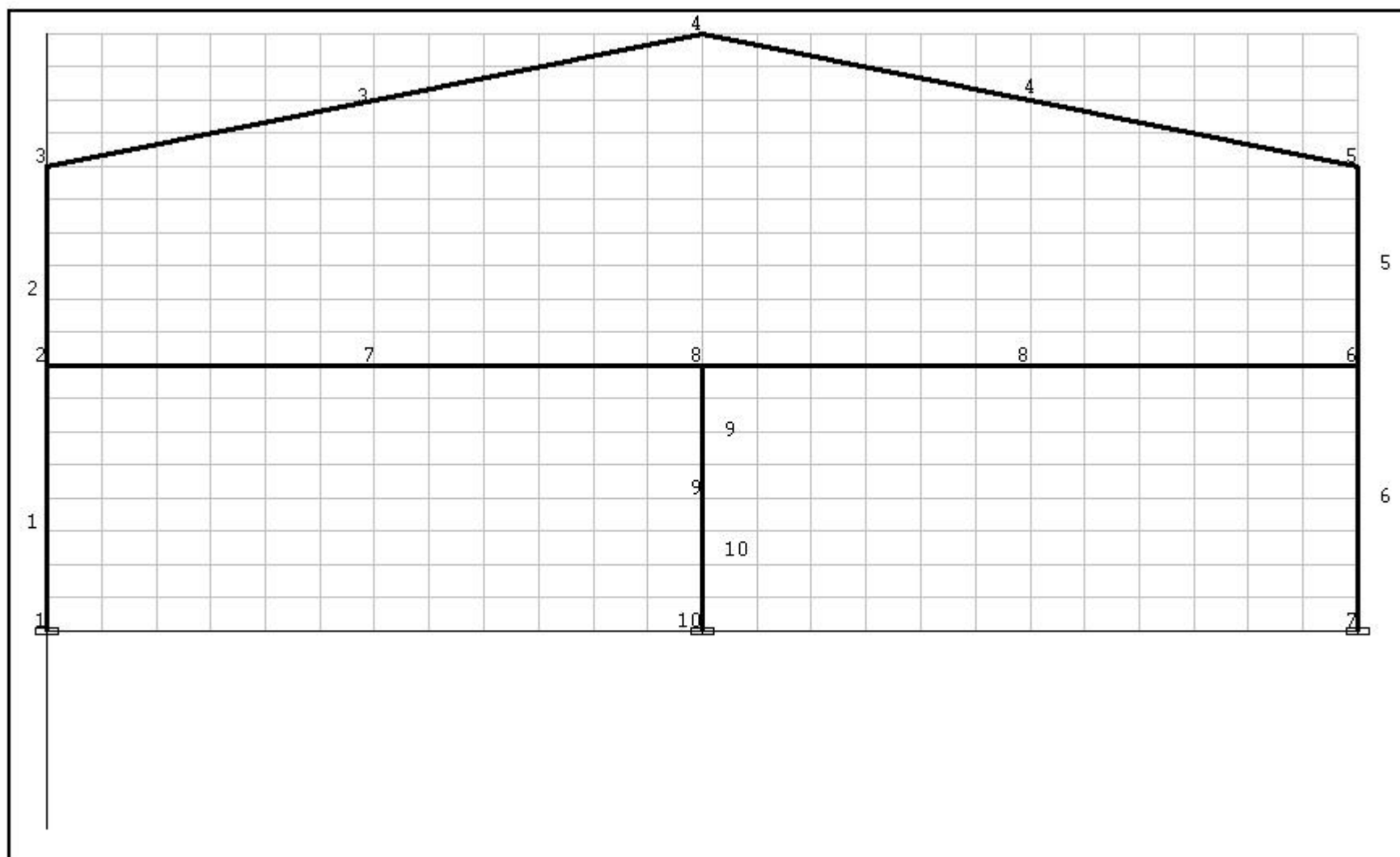
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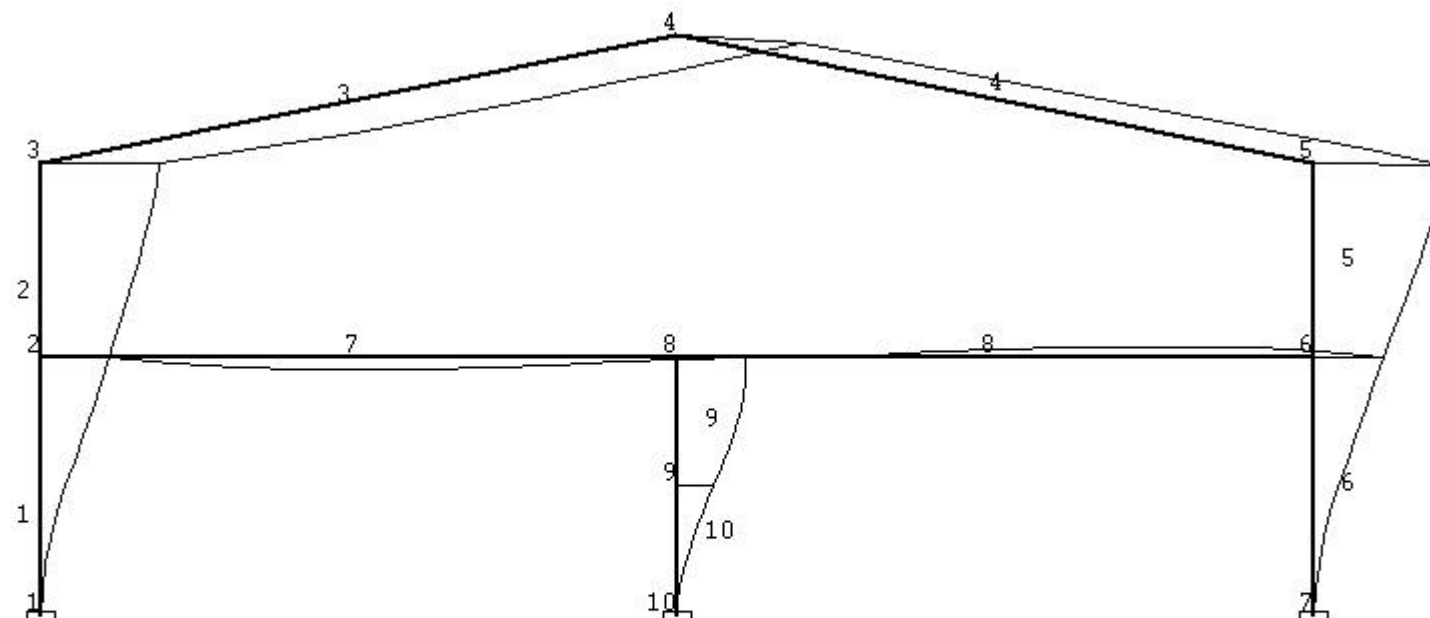
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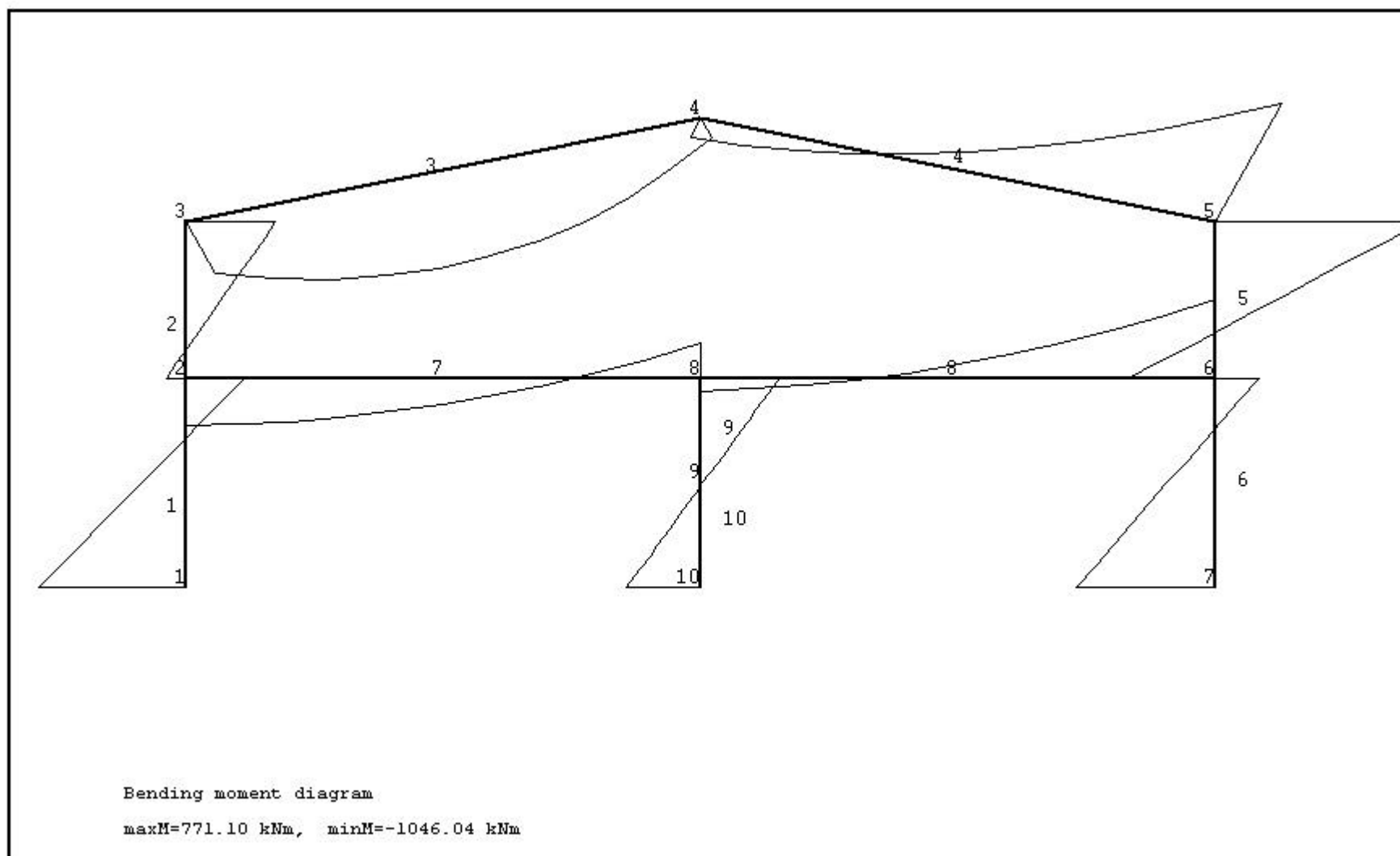


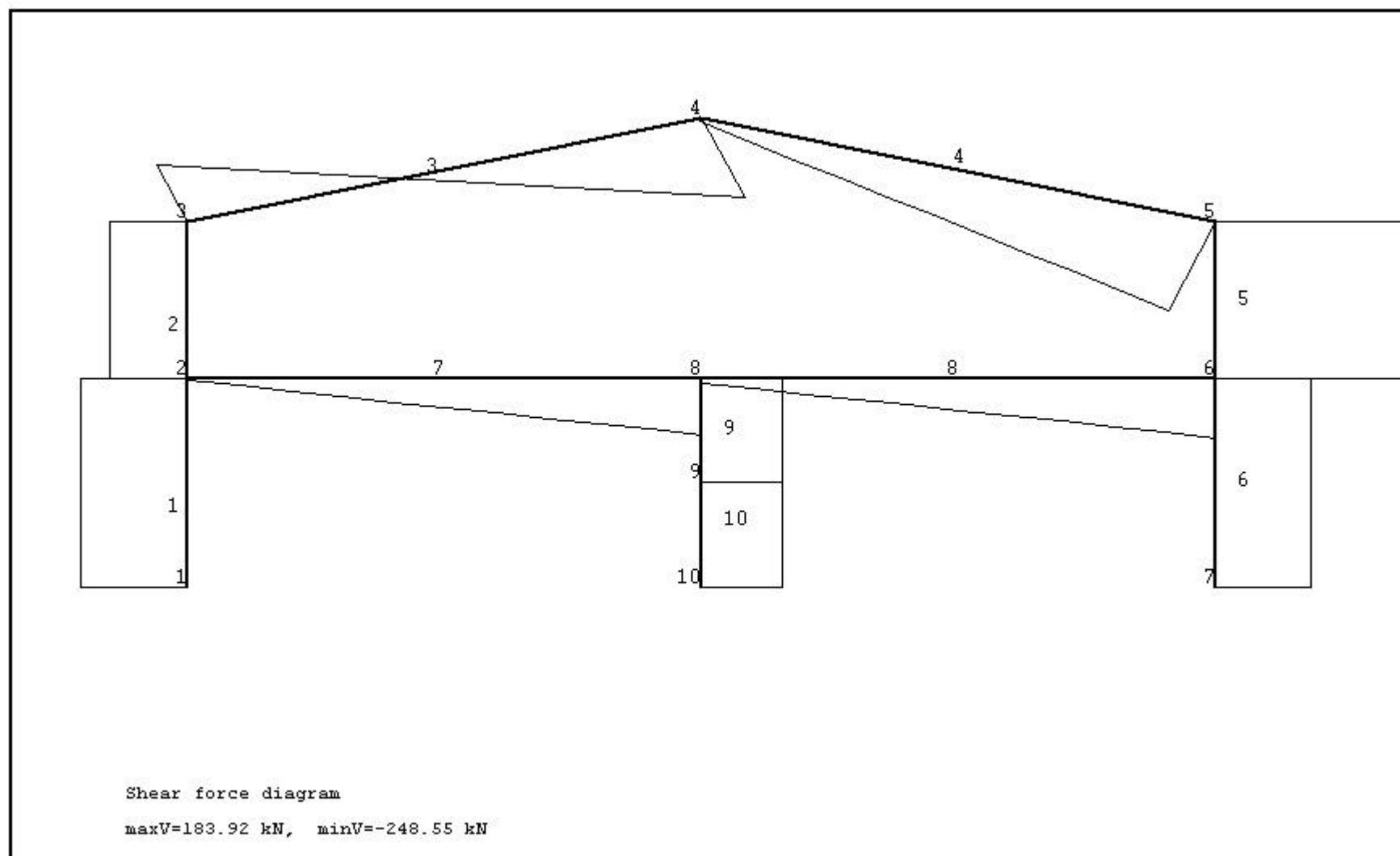


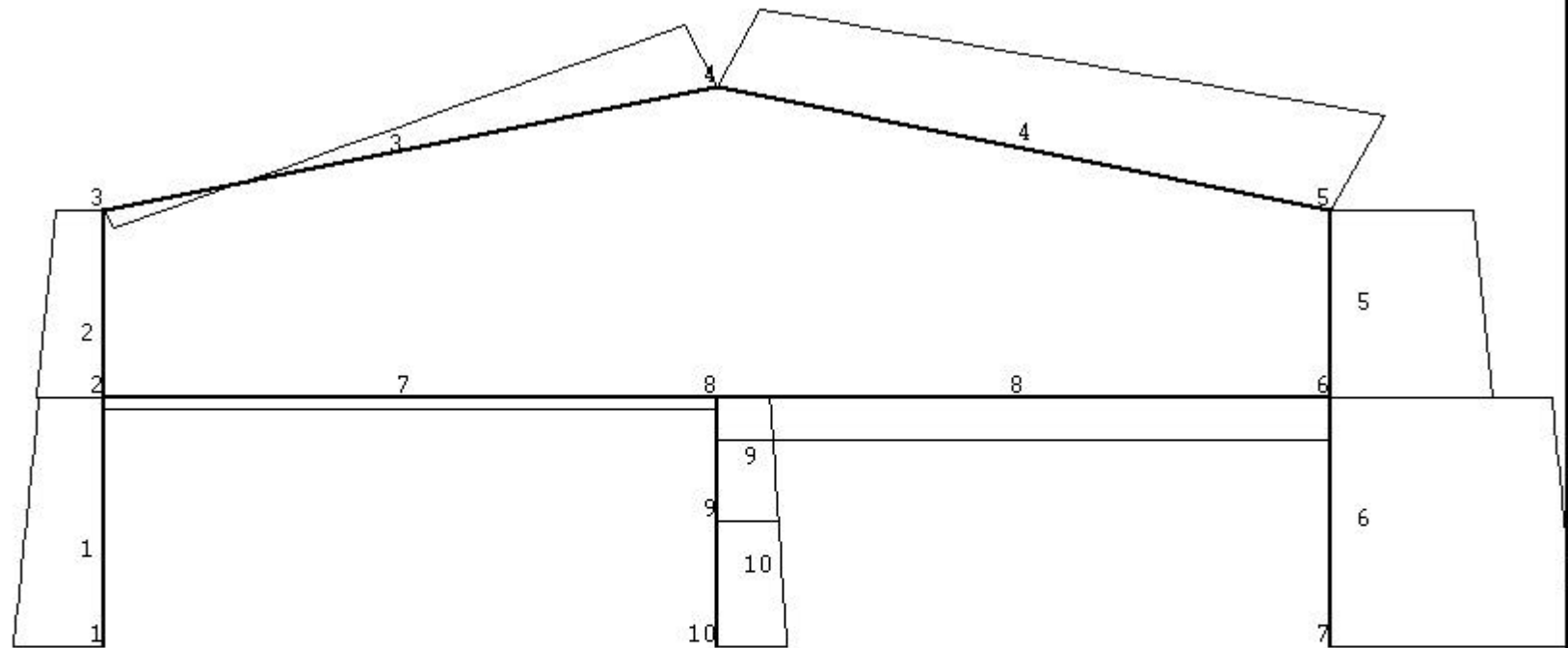


Displacement diagram

maxD=169.01 mm







Axial force diagram

maxN=133.32 kN, minN=-479.39 kN