

Analysis of Tensegrity Tower using Staad.Pro

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Abstract

Tensegrity is a portmanteau of tensional integrity. It refers to the integrity of structures as being based in a synergy between balanced tension and compression components. Tensegrity structures are built of struts and cables. The struts can resist compressive force and the cables cannot. Most cable-strut configurations which one might conceive are not in equilibrium, and if actually constructed will collapse to a different shape. Only cable-strut configurations in a stable equilibrium will be called tensegrity structures. If well designed, the application of forces to a tensegrity structure will deform it into a slightly different shape in a way that supports the applied forces. Tensegrity structures are very special cases of trusses, where members are assigned special functions. Some members are always in tension and others are always in compression. A tensegrity structure's struts cannot be attached to each other through joints that impart torques. The end of a strut can be attached to cables or ball jointed to other struts.

Keywords: Tensegrity, Structure, Staad.Pro, Analysis, Bamboo, Jute, Joints

Introduction

'Tensegrity' is a pattern that results when 'push' and 'pull' have a win-win relationship with each other. Pull is continuous where as push is discontinuous. The continuous pull is balanced by the discontinuous push, producing the integrity of tension and compression. These fundamental phenomena do not oppose, but rather complement each other. Tensegrity is the name for a synergy between a co-existing pairs of fundamental physical laws of push and pull, or compression and tension, or repulsion and attraction.

These structures have certain advantages over others like:

Tension stabilizes

A compressive member loses stiffness as it is loaded, whereas tensile member gains stiffness as it is loaded. Stiffness is lost in two ways in a compressive member. In the absence of any bending moments in the axially loaded members, the forces act exactly through the mass center, the material spreads, increasing the diameter of the center cross section; whereas the tensile member reduces its cross-section under load. In the presence of bending moments due to offsets in the line of force application and the

center of mass, the bar becomes softer due to the bending motion. For most materials, the tensile strength of a longitudinal member is larger than its buckling strength. Hence, a large stiffness-to-mass ratio can be achieved by increasing the use of tensile members.

Tensegrity Structures are easily tunable

The same deployment technique can also make small adjustments for fine tuning of the loaded structures, or adjustment of a damaged structure. Structures that are designed to allow tuning will be an important feature of next generation mechanical structures, including civil engineering structures.

Tensegrity Structures Facilitate High Precision Control

Structures that can be more precisely modeled can be more precisely controlled. Hence, tensegrity structures might open the door to quantum leaps in the precision of controlled structures. The architecture (geometry) dictates the mathematical properties and, hence, these mathematical results easily scale from the Nano-scale to the mega scale, from applications in microsurgery to antennas, to aircraft wings, and to robotic manipulators.

Its main advantage though, is its deployability. Because the compressive members of tensegrity structures are either disjoint or connected with ball joints, large displacement, deployability, and stowage in a compact volume will be immediate virtues of tensegrity structures. This feature offers operational and portability advantages. A portable bridge or a power transmission tower made as a tensegrity structure could be manufactured in the factory, stowed on a truck or helicopter in a small volume, transported to the construction site, and deployed using only winches for erection through cable tension. Erectable temporary shelters could be manufactured, transported, and deployed in a similar manner.

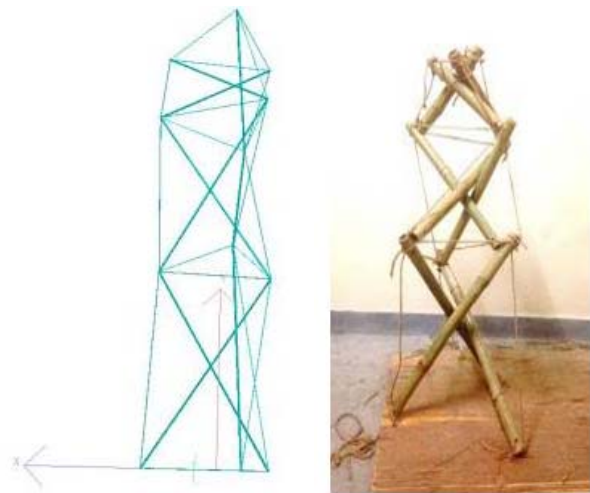


Figure 1 – 3D view of G+2 tensegrity structure & Its Real-Time Prototype

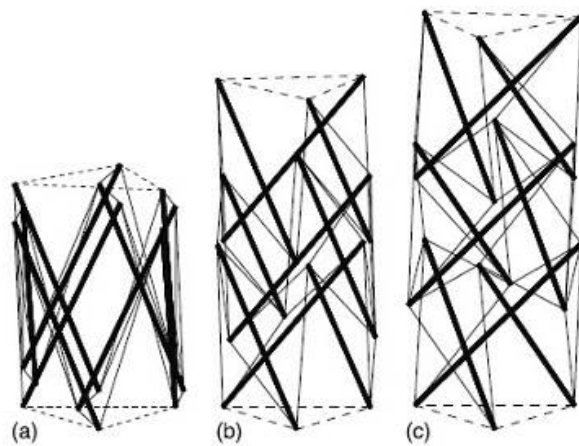


Figure 1: Folding of tensegrity structure

Tower Properties

Height of tower	: 12.33 m
Materials used in construction	: Bamboo & Jute
Place of construction	: Near college vicinity
Terrain category (as per IS 875-3)	: Category 2
Total members	: 30
Number of Compression members (Struts)	: 9
Number of Tension members (cables)	: 21
Diameter of cable	: 4 mm
External diameter of Struts	: 40 mm
Internal diameter of struts	: 20 mm
Height of ground storey	: 5.2 m
Height of 1st storey	: 4.33 m
Height of 2nd storey	: 2.6 m

Material Properties

Bamboo

Young's modulus (E)	: 1.4e + 007 KN/m ²
Poisson's ratio (nu)	: 0.35
Density	: 0.7 KN/m ³
Thermal coefficient (a)	: 7e-005/c
Critical damping	: 0.00152
Shear modulus (G)	: 17 KN/m ²

Jute

Young's modulus(E)	: 7.2555e+006 kN/m ²
Poisson's ratio (nu)	: 0.38
Density	: 14.326 KN/m ³
Thermal coefficient (a)	: 150/c
Critical damping	: 0.00075
Shear modulus (G)	: 4.1e+006 kN/m ²

Loads Applied

Load cases applied are as follows

Dead Load

Wind Load

Properties of Wind Loads

Wind load intensities are calculated Intensity of wind load calculated by "IS: 875(Part3): Wind Loads on Buildings

And Structures”.

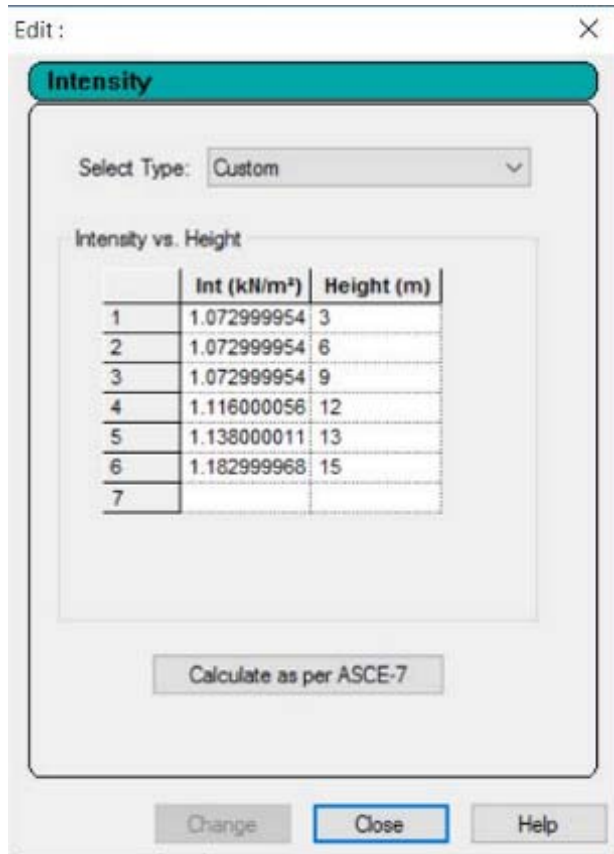


Figure 2 – intensity of load at different heights

Wind Load was applied on all the faces namely Windward face, Leeward face and Sideward Face.

Properties of wind load applied are as shown in figure below-

STAAD Analysis Results

Beam	Node A	Node B	Property Refn.	Material	Beta	Length m
1	12	10	1	JUTE	0.0	3.201
2	10	11	1	JUTE	0.0	3.200
3	11	12	1	JUTE	0.0	3.201
4	9	8	1	JUTE	0.0	3.201
5	8	7	1	JUTE	0.0	3.201
6	7	9	1	JUTE	0.0	3.201
7	5	6	1	JUTE	0.0	3.201
8	6	4	1	JUTE	0.0	3.201
9	4	5	1	JUTE	0.0	3.201
10	3	1	1	JUTE	0.0	3.201
11	2	1	1	JUTE	0.0	3.201
12	2	3	1	JUTE	0.0	3.201
13	11	8	1	JUTE	0.0	2.770
14	10	7	1	JUTE	0.0	2.770
15	12	9	1	JUTE	0.0	2.770
16	5	2	1	JUTE	0.0	5.267
17	4	1	1	JUTE	0.0	5.267
18	6	3	1	JUTE	0.0	5.267
19	5	8	1	JUTE	0.0	4.437
20	4	7	1	JUTE	0.0	4.437
21	6	9	1	JUTE	0.0	4.437
22	11	7	2	BAMBOO	0.0	4.416
23	10	9	2	BAMBOO	0.0	4.416
24	12	8	2	BAMBOO	0.0	4.416
25	8	6	2	BAMBOO	0.0	5.614
26	5	7	2	BAMBOO	0.0	5.614
27	4	9	2	BAMBOO	0.0	5.614
28	3	4	2	BAMBOO	0.0	6.308
29	2	6	2	BAMBOO	0.0	6.308
30	5	1	2	BAMBOO	0.0	6.308
31						

Figure 3 – Member Properties

Beam Combined Axial and Bending Stresses

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
1	1:DEAD LOAD	0.000	-24.362	0.341	24.562	-0.141	-24.362	24.562
		0.320	-11.316	0.293	11.516	-0.093	-11.316	11.516
		0.640	-1.123	0.244	1.323	-0.045	-1.123	1.323
		0.960	6.216	0.196	-6.016	0.004	-6.016	6.216
		1.280	10.700	0.148	-10.500	0.052	-10.500	10.700
		1.600	12.331	0.100	-12.131	0.100	-12.131	12.331
		1.920	10.700	0.052	-10.500	0.148	-10.500	10.700
		2.241	6.216	0.004	-6.016	0.196	-6.016	6.216
		2.561	-1.123	-0.045	1.323	0.244	-1.123	1.323
		2.881	-11.316	-0.093	11.516	0.293	-11.316	11.516
3.201	-24.362	-0.141	24.562	0.341	-24.362	24.562		
2	2:WIND LOAD	0.000	134.096	195.141	169.911	108.866	0.000	195.141
		0.320	137.678	196.514	166.330	117.493	0.000	196.514
		0.640	141.259	177.886	162.748	126.121	0.000	177.886
		0.960	144.841	169.259	159.167	134.749	0.000	169.259
		1.280	148.422	160.631	155.585	143.376	0.000	160.631
		1.600	152.004	152.004	152.004	152.004	0.000	152.004
		1.920	155.585	143.376	148.422	160.631	0.000	160.631
		2.241	159.167	134.749	144.841	169.259	0.000	169.259
		2.561	162.748	126.121	141.259	177.886	0.000	177.886
		2.881	166.330	117.493	137.678	186.514	0.000	186.514
3.201	169.911	108.866	134.096	195.141	0.000	195.141		
3	3:WIND Z	0.000	-82.746	-47.964	2.147	-32.635	-82.746	2.147
		0.320	-74.257	-46.431	-6.342	-34.168	-74.257	0.000
		0.640	-65.767	-44.898	-14.831	-35.701	-65.767	0.000
		0.960	-57.278	-43.365	-23.321	-37.234	-57.278	0.000
		1.280	-48.789	-41.832	-31.810	-38.767	-48.789	0.000
		1.600	-40.299	-40.299	-40.299	-40.299	-40.299	0.000
1.920	-31.810	-38.767	-48.789	-41.832	-48.789	0.000		

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		2.241	-23.321	-37.234	-57.278	-43.385	-57.278	0.000
		2.561	-14.831	-35.701	-65.767	-44.898	-65.767	0.000
		2.881	-8.342	-34.168	-74.257	-46.431	-74.257	0.000
		3.201	2.147	-32.835	-82.746	-47.964	-82.746	2.147
2	1:DEAD LOAD	0.000	-24.356	0.341	24.556	-0.141	-24.356	24.556
		0.320	-11.313	0.293	11.513	-0.093	-11.313	11.513
		0.640	-1.123	0.244	1.323	-0.044	-1.123	1.323
		0.960	6.214	0.196	-6.014	0.004	-6.014	6.214
		1.280	10.698	0.148	-10.498	0.052	-10.498	10.698
		1.600	12.328	0.100	-12.128	0.100	-12.128	12.328
		1.920	10.698	0.052	-10.497	0.148	-10.497	10.698
		2.240	6.214	0.004	-6.014	0.196	-6.014	6.214
		2.560	-1.123	-0.044	1.323	0.244	-1.123	1.323
		2.880	-11.313	-0.093	11.513	0.293	-11.313	11.513
		3.200	-24.356	-0.141	24.556	0.341	-24.356	24.556
	2:WIND LOAD	0.000	10.845	14.783	-66.143	-70.082	-70.082	14.783
		0.320	3.146	6.297	-56.444	-61.595	-61.595	6.297
		0.640	-4.553	-2.190	-50.746	-53.109	-53.109	0.000
		0.960	-12.252	-10.676	-43.047	-44.622	-44.622	0.000
		1.280	-19.950	-19.163	-35.348	-36.136	-36.136	0.000
		1.600	-27.649	-27.649	-27.649	-27.649	-27.649	0.000
		1.920	-35.348	-36.136	-19.950	-19.163	-36.136	0.000
		2.240	-43.047	-44.622	-12.252	-10.676	-44.622	0.000
		2.560	-50.746	-53.109	-4.553	-2.190	-53.109	0.000
		2.880	-56.444	-61.595	3.146	6.297	-61.595	6.297
		3.200	-66.143	-70.082	10.845	14.783	-70.082	14.783
	3:WIND Z	0.000	46.042	36.582	43.189	52.649	0.000	52.649
		0.320	45.756	38.188	43.474	51.042	0.000	51.042
		0.640	45.471	39.795	43.759	49.435	0.000	49.435
		0.960	45.186	41.402	44.045	47.828	0.000	47.828
		1.280	44.900	43.008	44.330	46.222	0.000	46.222
		1.600	44.615	44.615	44.615	44.615	0.000	44.615
		1.920	44.330	46.222	44.900	43.008	0.000	46.222
		2.240	44.045	47.828	45.186	41.402	0.000	47.828
		2.560	43.759	49.435	45.471	39.795	0.000	49.435
		2.880	43.474	51.042	45.756	38.188	0.000	51.042
		3.200	43.189	52.649	46.042	36.582	0.000	52.649
3	1:DEAD LOAD	0.000	-24.359	0.341	24.559	-0.141	-24.359	24.559
		0.320	-11.314	0.293	11.514	-0.093	-11.314	11.514
		0.640	-1.123	0.245	1.323	-0.044	-1.123	1.323
		0.960	6.215	0.196	-6.015	0.004	-6.015	6.215
		1.280	10.699	0.148	-10.499	0.052	-10.499	10.699
		1.600	12.330	0.100	-12.130	0.100	-12.130	12.330
		1.920	10.699	0.052	-10.499	0.148	-10.499	10.699
		2.240	6.215	0.004	-6.015	0.196	-6.015	6.215
		2.560	-1.123	-0.044	1.323	0.245	-1.123	1.323
		2.881	-11.314	-0.093	11.514	0.293	-11.314	11.514
		3.201	-24.359	-0.141	24.559	0.341	-24.359	24.559
	2:WIND LOAD	0.000	-122.634	-58.687	-81.476	-145.423	-145.423	0.000
		0.320	-118.518	-67.360	-85.592	-136.750	-136.750	0.000
		0.640	-114.402	-76.034	-89.708	-128.076	-128.076	0.000
		0.960	-110.287	-84.708	-93.824	-119.402	-119.402	0.000
		1.280	-106.171	-93.381	-97.939	-110.729	-110.729	0.000
		1.600	-102.055	-102.055	-102.055	-102.055	-102.055	0.000

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		1.920	-97.939	-110.729	-109.171	-93.381	-110.729	0.000
		2.240	-93.824	-119.402	-110.287	-84.708	-119.402	0.000
		2.560	-89.708	-128.076	-114.402	-76.034	-128.076	0.000
		2.881	-85.592	-136.750	-118.518	-67.360	-136.750	0.000
		3.201	-81.476	-145.423	-122.634	-58.687	-145.423	0.000
	3:WIND Z	0.000	-41.874	-91.024	-123.925	-74.775	-123.925	0.000
		0.320	-50.079	-89.399	-115.720	-76.400	-115.720	0.000
		0.640	-58.284	-87.774	-107.515	-78.025	-107.515	0.000
		0.960	-66.489	-86.149	-99.310	-79.650	-99.310	0.000
		1.280	-74.694	-84.524	-91.105	-81.275	-91.105	0.000
		1.600	-82.900	-82.900	-82.900	-82.900	-82.900	0.000
		1.920	-91.105	-81.275	-74.694	-84.524	-91.105	0.000
		2.240	-99.310	-79.650	-66.489	-86.149	-99.310	0.000
		2.560	-107.515	-78.025	-58.284	-87.774	-107.515	0.000
		2.881	-115.720	-76.400	-50.079	-89.399	-115.720	0.000
		3.201	-123.925	-74.775	-41.874	-91.024	-123.925	0.000
4	1:DEAD LOAD	0.000	-24.463	-0.297	24.461	0.296	-24.463	24.461
		0.320	-11.416	-0.238	11.415	0.236	-11.416	11.415
		0.640	-1.224	-0.179	1.222	0.177	-1.224	1.222
		0.960	6.115	-0.119	-6.116	0.118	-6.116	6.115
		1.280	10.599	-0.060	-10.601	0.058	-10.601	10.599
		1.600	12.230	-0.001	-12.232	-0.001	-12.232	12.230
		1.920	10.599	0.058	-10.601	-0.060	-10.601	10.599
		2.241	6.115	0.118	-6.116	-0.119	-6.116	6.115
		2.561	-1.224	0.177	1.222	-0.179	-1.224	1.222
		2.881	-11.416	0.236	11.415	-0.238	-11.416	11.415
		3.201	-24.463	0.296	24.461	-0.297	-24.463	24.461
	2:WIND LOAD	0.000	-164.545	-178.160	-167.775	-154.160	-178.160	0.000
		0.320	-164.868	-175.760	-167.452	-156.560	-175.760	0.000
		0.640	-165.191	-173.360	-167.129	-158.960	-173.360	0.000
		0.960	-165.514	-170.960	-166.806	-161.360	-170.960	0.000
		1.280	-165.837	-168.560	-166.483	-163.760	-168.560	0.000
		1.600	-166.160	-166.160	-166.160	-166.160	-166.160	0.000
		1.920	-166.483	-163.760	-165.837	-166.560	-168.560	0.000
		2.241	-166.806	-161.360	-165.514	-170.960	-170.960	0.000
		2.561	-167.129	-158.960	-165.191	-173.360	-173.360	0.000
		2.881	-167.452	-156.560	-164.868	-175.760	-175.760	0.000
		3.201	-167.775	-154.160	-164.545	-178.160	-178.160	0.000
	3:WIND Z	0.000	-28.811	48.788	68.641	-8.958	-28.811	68.641
		0.320	-19.066	43.013	58.895	-3.184	-19.066	58.895
		0.640	-9.321	37.239	49.150	2.591	-9.321	49.150
		0.960	0.424	31.464	39.405	8.365	0.000	39.405
		1.280	10.170	25.689	29.660	14.140	0.000	29.660
		1.600	19.915	19.915	19.915	19.915	0.000	19.915
		1.920	29.660	14.140	10.170	25.689	0.000	29.660
		2.241	39.405	8.365	0.424	31.464	0.000	39.405
		2.561	49.150	2.591	-9.321	37.239	-9.321	49.150
		2.881	58.895	-3.184	-19.066	43.013	-19.066	58.895
		3.201	68.641	-8.958	-28.811	48.788	-28.811	68.641
5	1:DEAD LOAD	0.000	-24.463	-0.297	24.462	0.296	-24.463	24.462
		0.320	-11.416	-0.238	11.415	0.236	-11.416	11.415
		0.640	-1.224	-0.178	1.222	0.177	-1.224	1.222
		0.960	6.115	-0.119	-6.116	0.118	-6.116	6.115
		1.280	10.600	-0.060	-10.601	0.059	-10.601	10.600

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		1.600	12.231	-0.001	-12.232	-0.001	-12.232	12.231
		1.920	10.600	0.059	-10.601	-0.060	-10.601	10.600
		2.241	6.115	0.118	-6.116	-0.119	-6.116	6.115
		2.561	-1.224	0.177	1.222	-0.178	-1.224	1.222
		2.881	-11.416	0.236	11.415	-0.238	-11.416	11.415
		3.201	-24.463	0.296	24.462	-0.297	-24.463	24.462
	2:WIND LOAD	0.000	1.821	22.411	69.298	48.708	0.000	69.298
		0.320	8.569	25.041	62.551	46.078	0.000	62.551
		0.640	15.316	27.671	55.803	43.449	0.000	55.803
		0.960	22.064	30.300	49.055	40.819	0.000	49.055
		1.280	28.812	32.930	42.307	38.189	0.000	42.307
		1.600	35.560	35.560	35.560	35.560	0.000	35.560
		1.920	42.307	38.189	28.812	32.930	0.000	42.307
		2.241	49.055	40.819	22.064	30.300	0.000	49.055
		2.561	55.803	43.449	15.316	27.671	0.000	55.803
		2.881	62.551	46.078	8.569	25.041	0.000	62.551
		3.201	69.298	48.708	1.821	22.411	0.000	69.298
	3:WIND Z	0.000	368.951	378.102	324.622	315.471	0.000	378.102
		0.320	364.518	371.839	329.055	321.734	0.000	371.839
		0.640	360.085	365.576	333.488	327.997	0.000	365.576
		0.960	355.652	359.313	337.921	334.260	0.000	359.313
		1.280	351.219	353.049	342.354	340.523	0.000	353.049
		1.600	346.786	346.786	346.786	346.786	0.000	346.786
		1.920	342.354	340.523	351.219	353.049	0.000	353.049
		2.241	337.921	334.260	355.652	359.313	0.000	359.313
		2.561	333.488	327.997	360.085	365.576	0.000	365.576
		2.881	329.055	321.734	364.518	371.839	0.000	371.839
		3.201	324.622	315.471	368.951	378.102	0.000	378.102
8	1:DEAD LOAD	0.000	-24.463	-0.297	24.461	0.296	-24.463	24.461
		0.320	-11.417	-0.238	11.415	0.236	-11.417	11.415
		0.640	-1.224	-0.179	1.222	0.177	-1.224	1.222
		0.960	6.115	-0.119	-6.116	0.118	-6.116	6.115
		1.280	10.599	-0.060	-10.601	0.058	-10.601	10.599
		1.600	12.230	-0.001	-12.232	-0.001	-12.232	12.230
		1.920	10.599	0.058	-10.601	-0.060	-10.601	10.599
		2.241	6.115	0.118	-6.116	-0.119	-6.116	6.115
		2.561	-1.224	0.177	1.222	-0.179	-1.224	1.222
		2.881	-11.417	0.236	11.415	-0.238	-11.417	11.415
		3.201	-24.463	0.296	24.461	-0.297	-24.463	24.461
	2:WIND LOAD	0.000	232.139	188.096	167.892	211.934	0.000	232.139
		0.320	225.714	190.480	174.316	209.551	0.000	225.714
		0.640	219.290	192.864	180.741	207.167	0.000	219.290
		0.960	212.865	195.248	187.166	204.783	0.000	212.865
		1.280	206.440	197.631	193.591	202.399	0.000	206.440
		1.600	200.015	200.015	200.015	200.015	0.000	200.015
		1.920	193.591	202.399	206.440	197.631	0.000	206.440
		2.241	187.166	204.783	212.865	195.248	0.000	212.865
		2.561	180.741	207.167	219.290	192.864	0.000	219.290
		2.881	174.316	209.551	225.714	190.480	0.000	225.714
		3.201	167.892	211.934	232.139	188.096	0.000	232.139
	3:WIND Z	0.000	-354.319	-349.724	-407.441	-412.035	-412.035	0.000
		0.320	-359.631	-355.955	-402.129	-405.804	-405.804	0.000
		0.640	-364.943	-362.187	-396.816	-399.573	-399.573	0.000
		0.960	-370.255	-368.418	-391.504	-393.342	-393.342	0.000

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		1.280	-375.568	-374.649	-386.192	-387.111	-387.111	0.000
		1.600	-380.880	-380.880	-380.880	-380.880	-380.880	0.000
		1.920	-386.192	-387.111	-375.568	-374.649	-387.111	0.000
		2.241	-391.504	-393.342	-370.255	-368.418	-393.342	0.000
		2.561	-396.816	-399.573	-364.943	-362.187	-399.573	0.000
		2.881	-402.129	-405.804	-359.631	-355.955	-405.804	0.000
		3.201	-407.441	-412.035	-354.319	-349.724	-412.035	0.000
7	1:DEAD LOAD	0.000	-24.887	-0.019	24.038	-0.830	-24.887	24.038
		0.320	-11.840	-0.100	10.991	-0.749	-11.840	10.991
		0.640	-1.647	-0.181	0.799	-0.668	-1.647	0.799
		0.960	5.691	-0.262	-6.540	-0.586	-6.540	5.691
		1.280	10.176	-0.343	-11.025	-0.505	-11.025	10.176
		1.600	11.807	-0.424	-12.655	-0.424	-12.655	11.807
		1.920	10.176	-0.505	-11.025	-0.343	-11.025	10.176
		2.241	5.691	-0.586	-6.540	-0.262	-6.540	5.691
		2.561	-1.647	-0.668	0.799	-0.181	-1.647	0.799
		2.881	-11.840	-0.749	10.991	-0.100	-11.840	10.991
		3.201	-24.887	-0.830	24.038	-0.019	-24.887	24.038
	2:WIND LOAD	0.000	-410.157	-371.663	-373.592	-412.086	-412.086	0.000
		0.320	-406.500	-375.705	-377.248	-408.043	-408.043	0.000
		0.640	-402.844	-379.747	-380.905	-404.001	-404.001	0.000
		0.960	-399.187	-383.790	-384.561	-399.959	-399.959	0.000
		1.280	-395.531	-387.832	-388.218	-395.917	-395.917	0.000
		1.600	-391.874	-391.874	-391.874	-391.874	-391.874	0.000
		1.920	-388.218	-395.917	-395.531	-387.832	-395.917	0.000
		2.241	-384.561	-399.959	-399.187	-383.790	-399.959	0.000
		2.561	-380.905	-404.001	-402.844	-379.747	-404.001	0.000
		2.881	-377.248	-408.043	-406.500	-375.705	-408.043	0.000
		3.201	-373.592	-412.086	-410.157	-371.663	-412.086	0.000
	3:WIND Z	0.000	478.318	481.459	413.043	409.902	0.000	481.459
		0.320	471.790	474.304	419.571	417.058	0.000	474.304
		0.640	465.263	467.148	426.098	424.214	0.000	467.148
		0.960	458.736	459.992	432.626	431.369	0.000	459.992
		1.280	452.208	452.836	439.153	438.525	0.000	452.836
		1.600	445.681	445.681	445.681	445.681	0.000	445.681
		1.920	439.153	438.525	452.208	452.836	0.000	452.836
		2.241	432.626	431.369	458.736	459.992	0.000	459.992
		2.561	426.098	424.214	465.263	467.148	0.000	467.148
		2.881	419.571	417.058	471.790	474.304	0.000	474.304
		3.201	413.043	409.902	478.318	481.459	0.000	481.459
8	1:DEAD LOAD	0.000	-24.887	-0.019	24.038	-0.830	-24.887	24.038
		0.320	-11.840	-0.100	10.991	-0.749	-11.840	10.991
		0.640	-1.647	-0.181	0.799	-0.668	-1.647	0.799
		0.960	5.691	-0.262	-6.540	-0.587	-6.540	5.691
		1.280	10.176	-0.343	-11.025	-0.505	-11.025	10.176
		1.600	11.807	-0.424	-12.655	-0.424	-12.655	11.807
		1.920	10.176	-0.505	-11.025	-0.343	-11.025	10.176
		2.241	5.691	-0.587	-6.540	-0.262	-6.540	5.691
		2.561	-1.647	-0.668	0.799	-0.181	-1.647	0.799
		2.881	-11.840	-0.749	10.991	-0.100	-11.840	10.991
		3.201	-24.887	-0.830	24.038	-0.019	-24.887	24.038
	2:WIND LOAD	0.000	-108.772	-73.016	-84.798	-120.553	-120.553	0.000
		0.320	-106.374	-77.770	-87.195	-115.800	-115.800	0.000
		0.640	-103.977	-82.524	-89.593	-111.046	-111.046	0.000

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		0.960	-101.580	-87.277	-91.990	-106.292	-106.292	0.000
		1.280	-99.182	-92.031	-94.387	-101.539	-101.539	0.000
		1.600	-96.785	-96.785	-96.785	-96.785	-96.785	0.000
		1.920	-94.387	-101.539	-99.182	-92.031	-101.539	0.000
		2.241	-91.990	-106.292	-101.580	-87.277	-106.292	0.000
		2.561	-89.593	-111.046	-103.977	-82.524	-111.046	0.000
		2.881	-87.195	-115.800	-106.374	-77.770	-115.800	0.000
		3.201	-84.798	-120.553	-108.772	-73.016	-120.553	0.000
	3:WIND Z	0.000	-690.573	-615.053	-614.138	-689.658	-690.573	0.000
		0.320	-682.929	-622.513	-621.781	-682.198	-682.929	0.000
		0.640	-675.286	-629.974	-629.425	-674.737	-675.286	0.000
		0.960	-667.642	-637.434	-637.068	-667.277	-667.642	0.000
		1.280	-659.999	-644.895	-644.712	-659.816	-659.999	0.000
		1.600	-652.355	-652.355	-652.355	-652.355	-652.355	0.000
		1.920	-644.712	-659.816	-659.999	-644.895	-659.999	0.000
		2.241	-637.068	-667.277	-667.642	-637.434	-667.642	0.000
		2.561	-629.425	-674.737	-675.286	-629.974	-675.286	0.000
		2.881	-621.781	-682.198	-682.929	-622.513	-682.929	0.000
		3.201	-614.138	-689.658	-690.573	-615.053	-690.573	0.000
9	1:DEAD LOAD	0.000	-24.886	-0.019	24.038	-0.830	-24.886	24.038
		0.320	-11.840	-0.100	10.991	-0.749	-11.840	10.991
		0.640	-1.648	-0.181	0.799	-0.668	-1.648	0.799
		0.960	5.691	-0.262	-6.540	-0.587	-6.540	5.691
		1.280	10.176	-0.343	-11.025	-0.506	-11.025	10.176
		1.600	11.807	-0.424	-12.655	-0.424	-12.655	11.807
		1.920	10.176	-0.506	-11.025	-0.343	-11.025	10.176
		2.241	5.691	-0.587	-6.540	-0.262	-6.540	5.691
		2.561	-1.648	-0.668	0.799	-0.181	-1.648	0.799
		2.881	-11.840	-0.749	10.991	-0.100	-11.840	10.991
		3.201	-24.886	-0.830	24.038	-0.019	-24.886	24.038
	2:WIND LOAD	0.000	607.647	598.409	547.107	556.345	0.000	607.647
		0.320	601.593	594.203	553.161	560.552	0.000	601.593
		0.640	595.539	589.998	559.215	564.758	0.000	595.539
		0.960	589.485	585.790	565.269	568.964	0.000	589.485
		1.280	583.431	581.584	571.323	573.171	0.000	583.431
		1.600	577.377	577.377	577.377	577.377	0.000	577.377
		1.920	571.323	573.171	583.431	581.584	0.000	583.431
		2.241	565.269	568.964	589.485	585.790	0.000	589.485
		2.561	559.215	564.758	595.539	589.998	0.000	595.539
		2.881	553.161	560.552	601.593	594.203	0.000	601.593
		3.201	547.107	556.345	607.647	598.409	0.000	607.647
	3:WIND Z	0.000	254.351	288.877	243.190	208.664	0.000	288.877
		0.320	253.235	280.855	244.306	216.686	0.000	280.855
		0.640	252.119	272.834	245.422	224.707	0.000	272.834
		0.960	251.003	264.813	246.538	232.728	0.000	264.813
		1.280	249.887	256.792	247.654	240.749	0.000	256.792
		1.600	248.770	248.770	248.770	248.770	0.000	248.770
		1.920	247.654	240.749	249.887	256.792	0.000	256.792
		2.241	246.538	232.728	251.003	264.813	0.000	264.813
		2.561	245.422	224.707	252.119	272.834	0.000	272.834
		2.881	244.306	216.686	253.235	280.855	0.000	280.855
		3.201	243.190	208.664	254.351	288.877	0.000	288.877
10	1:DEAD LOAD	0.000	-24.462	0.000	24.462	0.000	-24.462	24.462
		0.320	-11.416	0.000	11.416	0.000	-11.416	11.416

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		0.640	-1.223	0.000	1.223	0.000	-1.223	1.223
		0.960	6.116	0.000	-6.116	0.000	-6.116	6.116
		1.280	10.600	0.000	-10.600	0.000	-10.600	10.600
		1.600	12.231	0.000	-12.231	0.000	-12.231	12.231
		1.920	10.600	0.000	-10.600	0.000	-10.600	10.600
		2.241	6.116	0.000	-6.116	0.000	-6.116	6.116
		2.561	-1.223	0.000	1.223	0.000	-1.223	1.223
		2.881	-11.416	0.000	11.416	0.000	-11.416	11.416
		3.201	-24.462	0.000	24.462	0.000	-24.462	24.462
	2:WIND LOAD	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		0.320	0.000	0.000	0.000	0.000	0.000	0.000
		0.640	0.000	0.000	0.000	0.000	0.000	0.000
		0.960	0.000	0.000	0.000	0.000	0.000	0.000
		1.280	0.000	0.000	0.000	0.000	0.000	0.000
		1.600	0.000	0.000	0.000	0.000	0.000	0.000
		1.920	0.000	0.000	0.000	0.000	0.000	0.000
		2.241	0.000	0.000	0.000	0.000	0.000	0.000
		2.561	0.000	0.000	0.000	0.000	0.000	0.000
		2.881	0.000	0.000	0.000	0.000	0.000	0.000
		3.201	0.000	0.000	0.000	0.000	0.000	0.000
	3:WIND Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		0.320	0.000	0.000	0.000	0.000	0.000	0.000
		0.640	0.000	0.000	0.000	0.000	0.000	0.000
		0.960	0.000	0.000	0.000	0.000	0.000	0.000
		1.280	0.000	0.000	0.000	0.000	0.000	0.000
		1.600	0.000	0.000	0.000	0.000	0.000	0.000
		1.920	0.000	0.000	0.000	0.000	0.000	0.000
		2.241	0.000	0.000	0.000	0.000	0.000	0.000
		2.561	0.000	0.000	0.000	0.000	0.000	0.000
		2.881	0.000	0.000	0.000	0.000	0.000	0.000
		3.201	0.000	0.000	0.000	0.000	0.000	0.000
11	1:DEAD LOAD	0.000	-24.462	0.000	24.462	0.000	-24.462	24.462
		0.320	-11.416	0.000	11.416	0.000	-11.416	11.416
		0.640	-1.223	0.000	1.223	0.000	-1.223	1.223
		0.960	6.116	0.000	-6.116	0.000	-6.116	6.116
		1.280	10.600	0.000	-10.600	0.000	-10.600	10.600
		1.600	12.231	0.000	-12.231	0.000	-12.231	12.231
		1.920	10.600	0.000	-10.600	0.000	-10.600	10.600
		2.241	6.116	0.000	-6.116	0.000	-6.116	6.116
		2.561	-1.223	0.000	1.223	0.000	-1.223	1.223
		2.881	-11.416	0.000	11.416	0.000	-11.416	11.416
		3.201	-24.462	0.000	24.462	0.000	-24.462	24.462
	2:WIND LOAD	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		0.320	0.000	0.000	0.000	0.000	0.000	0.000
		0.640	0.000	0.000	0.000	0.000	0.000	0.000
		0.960	0.000	0.000	0.000	0.000	0.000	0.000
		1.280	0.000	0.000	0.000	0.000	0.000	0.000
		1.600	0.000	0.000	0.000	0.000	0.000	0.000
		1.920	0.000	0.000	0.000	0.000	0.000	0.000
		2.241	0.000	0.000	0.000	0.000	0.000	0.000
		2.561	0.000	0.000	0.000	0.000	0.000	0.000
		2.881	0.000	0.000	0.000	0.000	0.000	0.000
		3.201	0.000	0.000	0.000	0.000	0.000	0.000
	3:WIND Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		0.320	0.000	0.000	0.000	0.000	0.000	0.000
		0.640	0.000	0.000	0.000	0.000	0.000	0.000
		0.960	0.000	0.000	0.000	0.000	0.000	0.000
		1.280	0.000	0.000	0.000	0.000	0.000	0.000
		1.600	0.000	0.000	0.000	0.000	0.000	0.000
		1.920	0.000	0.000	0.000	0.000	0.000	0.000
		2.241	0.000	0.000	0.000	0.000	0.000	0.000
		2.561	0.000	0.000	0.000	0.000	0.000	0.000
		2.881	0.000	0.000	0.000	0.000	0.000	0.000
		3.201	0.000	0.000	0.000	0.000	0.000	0.000
12	1:DEAD LOAD	0.000	-24.462	0.000	24.462	0.000	-24.462	24.462
		0.320	-11.416	0.000	11.416	0.000	-11.416	11.416
		0.640	-1.223	0.000	1.223	0.000	-1.223	1.223
		0.960	6.115	0.000	-6.115	0.000	-6.115	6.115
		1.280	10.600	0.000	-10.600	0.000	-10.600	10.600
		1.600	12.231	0.000	-12.231	0.000	-12.231	12.231
		1.920	10.600	0.000	-10.600	0.000	-10.600	10.600
		2.241	6.115	0.000	-6.115	0.000	-6.115	6.115
		2.561	-1.223	0.000	1.223	0.000	-1.223	1.223
		2.881	-11.416	0.000	11.416	0.000	-11.416	11.416
		3.201	-24.462	0.000	24.462	0.000	-24.462	24.462
	2:WIND LOAD	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		0.320	0.000	0.000	0.000	0.000	0.000	0.000
		0.640	0.000	0.000	0.000	0.000	0.000	0.000
		0.960	0.000	0.000	0.000	0.000	0.000	0.000
		1.280	0.000	0.000	0.000	0.000	0.000	0.000
		1.600	0.000	0.000	0.000	0.000	0.000	0.000
		1.920	0.000	0.000	0.000	0.000	0.000	0.000
		2.241	0.000	0.000	0.000	0.000	0.000	0.000
		2.561	0.000	0.000	0.000	0.000	0.000	0.000
		2.881	0.000	0.000	0.000	0.000	0.000	0.000
		3.201	0.000	0.000	0.000	0.000	0.000	0.000
	3:WIND Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		0.320	0.000	0.000	0.000	0.000	0.000	0.000
		0.640	0.000	0.000	0.000	0.000	0.000	0.000
		0.960	0.000	0.000	0.000	0.000	0.000	0.000
		1.280	0.000	0.000	0.000	0.000	0.000	0.000
		1.600	0.000	0.000	0.000	0.000	0.000	0.000
		1.920	0.000	0.000	0.000	0.000	0.000	0.000
		2.241	0.000	0.000	0.000	0.000	0.000	0.000
		2.561	0.000	0.000	0.000	0.000	0.000	0.000
		2.881	0.000	0.000	0.000	0.000	0.000	0.000
		3.201	0.000	0.000	0.000	0.000	0.000	0.000
13	1:DEAD LOAD	0.000	-5.990	-0.102	5.809	-0.080	-5.990	5.809
		0.277	-2.698	-0.096	2.524	-0.078	-2.698	2.524
		0.554	-0.144	-0.090	-0.022	-0.077	-0.144	0.000
		0.831	1.672	-0.084	-1.831	-0.075	-1.831	1.672
		1.108	2.750	-0.078	-2.902	-0.074	-2.902	2.750
		1.385	3.091	-0.072	-3.235	-0.072	-3.235	3.091
		1.662	2.588	-0.066	-2.724	-0.070	-2.724	2.588
		1.939	1.346	-0.060	-1.476	-0.069	-1.476	1.346
		2.216	-0.633	-0.054	0.511	-0.067	-0.633	0.511
		2.493	-3.350	-0.048	3.235	-0.066	-3.350	3.235
		2.770	-6.805	-0.042	6.698	-0.064	-6.805	6.698

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
	2:WIND LOAD	0.000	-44.383	-21.945	-71.775	-94.213	-94.213	0.000
		0.277	-47.122	-29.172	-89.038	-88.988	-88.988	0.000
		0.554	-49.881	-36.399	-88.297	-79.759	-79.759	0.000
		0.831	-52.600	-43.625	-83.557	-72.532	-72.532	0.000
		1.108	-55.340	-50.852	-80.818	-85.308	-85.308	0.000
		1.385	-58.079	-58.079	-58.079	-58.079	-58.079	0.000
		1.662	-60.818	-65.308	-55.340	-50.852	-65.308	0.000
		1.939	-63.557	-72.532	-52.600	-43.625	-72.532	0.000
		2.216	-66.297	-79.759	-49.881	-36.399	-79.759	0.000
		2.493	-69.038	-86.988	-47.122	-29.172	-86.988	0.000
2.770	-71.775	-94.213	-44.383	-21.945	-94.213	0.000		
	3:WIND Z	0.000	-70.968	-32.533	69.948	31.512	-70.968	69.948
		0.277	-56.875	-26.128	55.854	25.108	-56.875	55.854
		0.554	-42.784	-19.724	41.763	18.703	-42.784	41.763
		0.831	-28.693	-13.319	27.672	12.299	-28.693	27.672
		1.108	-14.602	-6.915	13.581	5.894	-14.602	13.581
		1.385	-0.510	-0.510	-0.510	-0.510	-0.510	0.000
		1.662	13.581	5.894	-14.602	-6.915	-14.602	13.581
		1.939	27.672	12.299	-28.693	-13.319	-28.693	27.672
		2.216	41.763	18.703	-42.784	-19.724	-42.784	41.763
		2.493	55.854	25.108	-56.875	-26.128	-56.875	55.854
2.770	69.948	31.512	-70.968	-32.533	-70.968	69.948		
14	1:DEAD LOAD	0.000	-5.993	-0.102	5.811	-0.080	-5.993	5.811
		0.277	-2.699	-0.096	2.525	-0.078	-2.699	2.525
		0.554	-0.144	-0.090	-0.022	-0.077	-0.144	0.000
		0.831	1.673	-0.084	-1.832	-0.075	-1.832	1.673
		1.108	2.751	-0.078	-2.903	-0.074	-2.903	2.751
		1.385	3.092	-0.072	-3.236	-0.072	-3.236	3.092
		1.662	2.588	-0.068	-2.725	-0.071	-2.725	2.588
		1.939	1.347	-0.060	-1.476	-0.069	-1.476	1.347
		2.216	-0.633	-0.054	0.511	-0.068	-0.633	0.511
		2.493	-3.351	-0.049	3.236	-0.066	-3.351	3.236
2.770	-6.807	-0.043	6.700	-0.064	-6.807	6.700		
	2:WIND LOAD	0.000	49.915	-15.412	-12.345	52.982	-15.412	52.982
		0.277	43.689	-8.572	-8.119	46.142	-8.572	46.142
		0.554	37.463	-1.733	0.107	39.303	-1.733	39.303
		0.831	31.237	5.106	6.333	32.464	0.000	32.464
		1.108	25.011	11.948	12.559	25.624	0.000	25.624
		1.385	18.785	18.785	18.785	18.785	0.000	18.785
		1.662	12.559	25.624	25.011	11.948	0.000	25.624
		1.939	6.333	32.464	31.237	5.106	0.000	32.464
		2.216	0.107	39.303	37.463	-1.733	-1.733	39.303
		2.493	-6.119	46.142	43.689	-8.572	-8.572	46.142
2.770	-12.345	52.982	49.915	-15.412	-15.412	52.982		
	3:WIND Z	0.000	2.386	-28.506	-39.575	-8.683	-39.575	2.386
		0.277	-1.810	-26.524	-35.379	-10.666	-35.379	0.000
		0.554	-6.007	-24.542	-31.183	-12.648	-31.183	0.000
		0.831	-10.203	-22.560	-26.987	-14.630	-26.987	0.000
		1.108	-14.399	-20.577	-22.791	-16.613	-22.791	0.000
		1.385	-18.595	-18.595	-18.595	-18.595	-18.595	0.000
		1.662	-22.791	-16.613	-14.399	-20.577	-22.791	0.000
		1.939	-26.987	-14.630	-10.203	-22.560	-26.987	0.000
		2.216	-31.183	-12.648	-6.007	-24.542	-31.183	0.000
		2.493	-35.379	-10.666	-1.810	-26.524	-35.379	0.000

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)		
		2.770	-39.575	-8.683	2.386	-28.506	-39.575	2.386		
15	1:DEAD LOAD	0.000	-5.993	-0.102	5.811	-0.080	-5.993	5.811		
		0.277	-2.699	-0.098	2.525	-0.078	-2.699	2.525		
		0.554	-0.144	-0.090	-0.022	-0.077	-0.144	0.000		
		0.831	1.673	-0.084	-1.832	-0.075	-1.832	1.673		
		1.108	2.751	-0.078	-2.903	-0.074	-2.903	2.751		
		1.385	3.092	-0.072	-3.236	-0.072	-3.236	3.092		
		1.662	2.588	-0.066	-2.725	-0.071	-2.725	2.588		
		1.939	1.347	-0.060	-1.476	-0.069	-1.476	1.347		
		2.216	-0.633	-0.054	0.511	-0.067	-0.633	0.511		
		2.493	-3.351	-0.049	3.236	-0.066	-3.351	3.236		
		2.770	-6.807	-0.043	6.700	-0.064	-6.807	6.700		
			2:WIND LOAD	0.000	56.310	-14.106	-117.023	-46.606	-117.023	56.310
				0.277	38.977	-17.356	-99.690	-43.356	-99.690	38.977
				0.554	21.644	-20.606	-82.356	-40.106	-82.356	21.644
	0.831	4.310		-23.856	-65.023	-36.856	-65.023	4.310		
	1.108	-13.023		-27.106	-47.690	-33.606	-47.690	0.000		
	1.385	-30.356		-30.356	-30.356	-30.356	-30.356	0.000		
	1.662	-47.690		-33.606	-13.023	-27.106	-47.690	0.000		
	1.939	-65.023		-36.856	4.310	-23.856	-65.023	4.310		
	2.216	-82.356		-40.106	21.644	-20.606	-82.356	21.644		
	2.493	-99.690		-43.356	38.977	-17.356	-99.690	38.977		
	2.770	-117.023		-46.606	56.310	-14.106	-117.023	56.310		
	3:WIND Z	0.000		47.601	144.543	131.005	34.063	0.000	144.543	
		0.277		55.941	133.495	122.664	45.111	0.000	133.495	
		0.554		64.281	122.447	114.324	56.159	0.000	122.447	
		0.831	72.622	111.399	105.983	67.207	0.000	111.399		
		1.108	80.962	100.351	97.643	78.255	0.000	100.351		
		1.385	89.303	89.303	89.303	89.303	0.000	89.303		
		1.662	97.643	78.255	80.962	100.351	0.000	100.351		
		1.939	105.983	67.207	72.622	111.399	0.000	111.399		
		2.216	114.324	56.159	64.281	122.447	0.000	122.447		
		2.493	122.664	45.111	55.941	133.495	0.000	133.495		
		2.770	131.005	34.063	47.601	144.543	0.000	144.543		
16		1:DEAD LOAD	0.000	-11.929	0.085	12.054	0.041	-11.929	12.054	
			0.529	-5.498	0.088	5.638	0.053	-5.498	5.638	
			1.057	-0.476	0.091	0.631	0.065	-0.476	0.631	
	1.586		3.138	0.094	-2.968	0.076	-2.968	3.138		
	2.115		5.342	0.097	-5.157	0.088	-5.157	5.342		
	2.644		6.138	0.100	-5.938	0.100	-5.938	6.138		
	3.172		5.323	0.103	-5.109	0.112	-5.109	5.323		
	3.701		3.100	0.106	-2.870	0.124	-2.870	3.100		
	4.230		-0.532	0.109	0.777	0.135	-0.532	0.777		
	4.759		-5.573	0.112	5.833	0.147	-5.573	5.833		
	5.287		-12.023	0.115	12.298	0.159	-12.023	12.298		
			2:WIND LOAD	0.000	-1.92E+3	-1.91E+3	-1.91E+3	-1.92E+3	-1.92E+3	0.000
				0.529	-1.92E+3	-1.91E+3	-1.91E+3	-1.92E+3	-1.92E+3	0.000
				1.057	-1.92E+3	-1.91E+3	-1.91E+3	-1.92E+3	-1.92E+3	0.000
	1.586	-1.92E+3		-1.91E+3	-1.92E+3	-1.92E+3	-1.92E+3	0.000		
	2.115	-1.92E+3		-1.92E+3	-1.92E+3	-1.92E+3	-1.92E+3	0.000		
	2.644	-1.92E+3		-1.92E+3	-1.92E+3	-1.92E+3	-1.92E+3	0.000		
	3.172	-1.92E+3		-1.92E+3	-1.92E+3	-1.92E+3	-1.92E+3	0.000		
	3.701	-1.92E+3		-1.92E+3	-1.92E+3	-1.91E+3	-1.92E+3	0.000		
	4.230	-1.91E+3		-1.92E+3	-1.92E+3	-1.91E+3	-1.92E+3	0.000		

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		4.759	-1.91E+3	-1.92E+3	-1.92E+3	-1.91E+3	-1.92E+3	0.000
		5.287	-1.91E+3	-1.92E+3	-1.92E+3	-1.91E+3	-1.92E+3	0.000
	3:WIND Z	0.000	2.02E+3	2.01E+3	2.02E+3	2.03E+3	0.000	2.03E+3
		0.529	2.02E+3	2.02E+3	2.02E+3	2.03E+3	0.000	2.03E+3
		1.057	2.02E+3	2.02E+3	2.02E+3	2.03E+3	0.000	2.03E+3
		1.588	2.02E+3	2.02E+3	2.02E+3	2.02E+3	0.000	2.02E+3
		2.115	2.02E+3	2.02E+3	2.02E+3	2.02E+3	0.000	2.02E+3
		2.644	2.02E+3	2.02E+3	2.02E+3	2.02E+3	0.000	2.02E+3
		3.172	2.02E+3	2.02E+3	2.02E+3	2.02E+3	0.000	2.02E+3
		3.701	2.02E+3	2.02E+3	2.02E+3	2.02E+3	0.000	2.02E+3
		4.230	2.02E+3	2.03E+3	2.02E+3	2.02E+3	0.000	2.03E+3
		4.759	2.02E+3	2.03E+3	2.02E+3	2.02E+3	0.000	2.03E+3
		5.287	2.02E+3	2.03E+3	2.02E+3	2.01E+3	0.000	2.03E+3
17	1:DEAD LOAD	0.000	-11.929	0.084	12.054	0.041	-11.929	12.054
		0.529	-5.498	0.087	5.638	0.052	-5.498	5.638
		1.057	-0.476	0.090	0.631	0.064	-0.476	0.631
		1.588	3.138	0.094	-2.968	0.076	-2.968	3.138
		2.115	5.342	0.097	-5.158	0.088	-5.158	5.342
		2.644	6.138	0.100	-5.938	0.100	-5.938	6.138
		3.172	5.323	0.103	-5.109	0.112	-5.109	5.323
		3.701	3.100	0.106	-2.871	0.123	-2.871	3.100
		4.230	-0.532	0.109	0.776	0.135	-0.532	0.776
		4.759	-5.574	0.112	5.833	0.147	-5.574	5.833
		5.287	-12.024	0.115	12.298	0.159	-12.024	12.298
	2:WIND LOAD	0.000	2.27E+3	2.26E+3	2.26E+3	2.27E+3	0.000	2.27E+3
		0.529	2.27E+3	2.26E+3	2.26E+3	2.27E+3	0.000	2.27E+3
		1.057	2.27E+3	2.26E+3	2.26E+3	2.27E+3	0.000	2.27E+3
		1.588	2.27E+3	2.26E+3	2.26E+3	2.27E+3	0.000	2.27E+3
		2.115	2.27E+3	2.26E+3	2.26E+3	2.27E+3	0.000	2.27E+3
		2.644	2.27E+3	2.27E+3	2.27E+3	2.27E+3	0.000	2.27E+3
		3.172	2.26E+3	2.27E+3	2.27E+3	2.26E+3	0.000	2.27E+3
		3.701	2.26E+3	2.27E+3	2.27E+3	2.26E+3	0.000	2.27E+3
		4.230	2.26E+3	2.27E+3	2.27E+3	2.26E+3	0.000	2.27E+3
		4.759	2.26E+3	2.27E+3	2.27E+3	2.26E+3	0.000	2.27E+3
		5.287	2.26E+3	2.27E+3	2.27E+3	2.26E+3	0.000	2.27E+3
	3:WIND Z	0.000	1.28E+3	1.26E+3	1.24E+3	1.26E+3	0.000	1.28E+3
		0.529	1.28E+3	1.26E+3	1.24E+3	1.26E+3	0.000	1.28E+3
		1.057	1.27E+3	1.26E+3	1.25E+3	1.26E+3	0.000	1.27E+3
		1.588	1.27E+3	1.26E+3	1.25E+3	1.26E+3	0.000	1.27E+3
		2.115	1.27E+3	1.26E+3	1.26E+3	1.26E+3	0.000	1.27E+3
		2.644	1.26E+3	1.26E+3	1.26E+3	1.26E+3	0.000	1.26E+3
		3.172	1.26E+3	1.26E+3	1.27E+3	1.26E+3	0.000	1.27E+3
		3.701	1.25E+3	1.26E+3	1.27E+3	1.26E+3	0.000	1.27E+3
		4.230	1.25E+3	1.26E+3	1.27E+3	1.26E+3	0.000	1.27E+3
		4.759	1.24E+3	1.26E+3	1.28E+3	1.26E+3	0.000	1.28E+3
		5.287	1.24E+3	1.26E+3	1.28E+3	1.26E+3	0.000	1.28E+3
18	1:DEAD LOAD	0.000	-11.929	0.084	12.054	0.041	-11.929	12.054
		0.529	-5.498	0.088	5.638	0.052	-5.498	5.638
		1.057	-0.476	0.091	0.631	0.064	-0.476	0.631
		1.588	3.138	0.094	-2.968	0.076	-2.968	3.138
		2.115	5.342	0.097	-5.158	0.088	-5.158	5.342
		2.644	6.138	0.100	-5.938	0.100	-5.938	6.138
		3.172	5.323	0.103	-5.109	0.112	-5.109	5.323
		3.701	3.100	0.106	-2.871	0.123	-2.871	3.100

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		4.230	-0.532	0.109	0.777	0.135	-0.532	0.777
		4.759	-5.574	0.112	5.833	0.147	-5.574	5.833
		5.287	-12.024	0.115	12.298	0.159	-12.024	12.298
	2:WIND LOAD	0.000	-354.036	-362.277	-380.436	-372.195	-380.436	0.000
		0.529	-356.676	-363.269	-377.796	-371.203	-377.796	0.000
		1.057	-359.316	-364.261	-375.156	-370.211	-375.156	0.000
		1.586	-361.956	-365.252	-372.516	-369.219	-372.516	0.000
		2.115	-364.596	-366.244	-369.876	-368.228	-369.876	0.000
		2.644	-367.236	-367.236	-367.236	-367.236	-367.236	0.000
		3.172	-369.876	-368.228	-364.596	-366.244	-369.876	0.000
		3.701	-372.516	-369.219	-361.956	-365.252	-372.516	0.000
		4.230	-375.156	-370.211	-359.316	-364.261	-375.156	0.000
		4.759	-377.796	-371.203	-356.676	-363.269	-377.796	0.000
		5.287	-380.436	-372.195	-354.036	-362.277	-380.436	0.000
	3:WIND Z	0.000	-3.29E+3	-3.28E+3	-3.29E+3	-3.31E+3	-3.31E+3	0.000
		0.529	-3.29E+3	-3.28E+3	-3.29E+3	-3.3E+3	-3.3E+3	0.000
		1.057	-3.29E+3	-3.28E+3	-3.29E+3	-3.3E+3	-3.3E+3	0.000
		1.586	-3.29E+3	-3.29E+3	-3.29E+3	-3.3E+3	-3.3E+3	0.000
		2.115	-3.29E+3	-3.29E+3	-3.29E+3	-3.29E+3	-3.29E+3	0.000
		2.644	-3.29E+3	-3.29E+3	-3.29E+3	-3.29E+3	-3.29E+3	0.000
		3.172	-3.29E+3	-3.29E+3	-3.29E+3	-3.29E+3	-3.29E+3	0.000
		3.701	-3.29E+3	-3.3E+3	-3.29E+3	-3.29E+3	-3.3E+3	0.000
		4.230	-3.29E+3	-3.3E+3	-3.29E+3	-3.28E+3	-3.3E+3	0.000
		4.759	-3.29E+3	-3.3E+3	-3.29E+3	-3.28E+3	-3.3E+3	0.000
		5.287	-3.29E+3	-3.31E+3	-3.29E+3	-3.28E+3	-3.31E+3	0.000
19	1:DEAD LOAD	0.000	-10.180	0.172	10.507	0.156	-10.180	10.507
		0.444	-4.739	0.164	5.054	0.151	-4.739	5.054
		0.887	-0.481	0.156	0.783	0.146	-0.481	0.783
		1.331	2.595	0.148	-2.305	0.142	-2.305	2.595
		1.775	4.489	0.140	-4.211	0.137	-4.211	4.489
		2.219	5.200	0.133	-4.935	0.133	-4.935	5.200
		2.662	4.560	0.125	-4.307	0.128	-4.307	4.560
		3.106	2.737	0.117	-2.497	0.123	-2.497	2.737
		3.550	-0.268	0.109	0.495	0.119	-0.268	0.495
		3.994	-4.455	0.101	4.670	0.114	-4.455	4.670
		4.437	-9.825	0.093	10.027	0.109	-9.825	10.027
	2:WIND LOAD	0.000	-367.488	-361.686	-318.064	-323.866	-367.488	0.000
		0.444	-362.546	-357.904	-323.006	-327.648	-362.546	0.000
		0.887	-357.603	-354.122	-327.949	-331.430	-357.603	0.000
		1.331	-352.661	-350.340	-332.891	-335.212	-352.661	0.000
		1.775	-347.718	-346.558	-337.834	-338.994	-347.718	0.000
		2.219	-342.776	-342.776	-342.776	-342.776	-342.776	0.000
		2.662	-337.834	-338.994	-347.718	-346.558	-347.718	0.000
		3.106	-332.891	-335.212	-352.661	-350.340	-352.661	0.000
		3.550	-327.949	-331.430	-357.603	-354.122	-357.603	0.000
		3.994	-323.006	-327.648	-362.546	-357.904	-362.546	0.000
		4.437	-318.064	-323.866	-367.488	-361.686	-367.488	0.000
	3:WIND Z	0.000	624.587	679.296	683.348	628.638	0.000	683.348
		0.444	630.463	674.231	677.472	633.704	0.000	677.472
		0.887	636.339	669.165	671.596	638.770	0.000	671.596
		1.331	642.215	664.099	665.719	643.836	0.000	665.719
		1.775	648.091	659.033	659.843	648.901	0.000	659.843
		2.219	653.967	653.967	653.967	653.967	0.000	653.967
		2.662	659.843	648.901	648.091	659.033	0.000	659.843

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		3.106	665.719	643.836	642.215	664.099	0.000	665.719
		3.550	671.596	638.770	636.339	669.165	0.000	671.596
		3.994	677.472	633.704	630.463	674.231	0.000	677.472
		4.437	683.348	628.638	624.587	679.296	0.000	683.348
20	1:DEAD LOAD	0.000	-10.181	0.171	10.507	0.155	-10.181	10.507
		0.444	-4.740	0.163	5.054	0.151	-4.740	5.054
		0.887	-0.481	0.156	0.783	0.146	-0.481	0.783
		1.331	2.595	0.148	-2.306	0.141	-2.306	2.595
		1.775	4.488	0.140	-4.212	0.137	-4.212	4.488
		2.219	5.200	0.132	-4.935	0.132	-4.935	5.200
		2.662	4.560	0.124	-4.308	0.128	-4.308	4.560
		3.106	2.737	0.117	-2.498	0.123	-2.498	2.737
		3.550	-0.268	0.109	0.495	0.118	-0.268	0.495
		3.994	-4.455	0.101	4.670	0.114	-4.455	4.670
		4.437	-9.825	0.093	10.027	0.109	-9.825	10.027
	2:WIND LOAD	0.000	644.528	689.160	686.003	641.371	0.000	689.160
		0.444	648.676	684.381	681.855	646.150	0.000	684.381
		0.887	652.823	679.602	677.708	650.929	0.000	679.602
		1.331	656.971	674.823	673.560	655.707	0.000	674.823
		1.775	661.118	670.044	669.413	660.486	0.000	670.044
		2.219	665.265	665.265	665.265	665.265	0.000	665.265
		2.662	669.413	660.486	661.118	670.044	0.000	670.044
		3.106	673.560	655.707	656.971	674.823	0.000	674.823
		3.550	677.708	650.929	652.823	679.602	0.000	679.602
		3.994	681.855	646.150	648.676	684.381	0.000	684.381
		4.437	686.003	641.371	644.528	689.160	0.000	689.160
	3:WIND Z	0.000	-56.945	-67.510	-114.001	-103.436	-114.001	0.000
		0.444	-62.650	-71.102	-108.295	-99.843	-108.295	0.000
		0.887	-68.356	-74.695	-102.589	-96.250	-102.589	0.000
		1.331	-74.061	-78.287	-96.884	-92.658	-96.884	0.000
		1.775	-79.767	-81.880	-91.178	-89.065	-91.178	0.000
		2.219	-85.473	-85.473	-85.473	-85.473	-85.473	0.000
		2.662	-91.178	-89.065	-79.767	-81.880	-91.178	0.000
		3.106	-96.884	-92.658	-74.061	-78.287	-96.884	0.000
		3.550	-102.589	-96.250	-68.356	-74.695	-102.589	0.000
		3.994	-108.295	-99.843	-62.650	-71.102	-108.295	0.000
		4.437	-114.001	-103.436	-56.945	-67.510	-114.001	0.000
21	1:DEAD LOAD	0.000	-10.180	0.171	10.507	0.155	-10.180	10.507
		0.444	-4.740	0.164	5.054	0.151	-4.740	5.054
		0.887	-0.481	0.156	0.783	0.146	-0.481	0.783
		1.331	2.595	0.148	-2.306	0.142	-2.306	2.595
		1.775	4.489	0.140	-4.212	0.137	-4.212	4.489
		2.219	5.200	0.132	-4.935	0.132	-4.935	5.200
		2.662	4.560	0.124	-4.308	0.128	-4.308	4.560
		3.106	2.737	0.117	-2.497	0.123	-2.497	2.737
		3.550	-0.268	0.109	0.495	0.119	-0.268	0.495
		3.994	-4.455	0.101	4.670	0.114	-4.455	4.670
		4.437	-9.825	0.093	10.028	0.109	-9.825	10.028
	2:WIND LOAD	0.000	-354.333	-372.315	-384.713	-366.731	-384.713	0.000
		0.444	-357.371	-371.756	-381.675	-367.289	-381.675	0.000
		0.887	-360.409	-371.198	-378.637	-367.848	-378.637	0.000
		1.331	-363.447	-370.640	-375.599	-368.406	-375.599	0.000
		1.775	-366.485	-370.081	-372.561	-368.965	-372.561	0.000
		2.219	-369.523	-369.523	-369.523	-369.523	-369.523	0.000

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		2.662	-372.561	-368.965	-366.485	-370.081	-372.561	0.000
		3.106	-375.599	-368.406	-363.447	-370.640	-375.599	0.000
		3.550	-378.637	-367.848	-360.409	-371.198	-378.637	0.000
		3.994	-381.675	-367.289	-357.371	-371.756	-381.675	0.000
		4.437	-384.713	-366.731	-354.333	-372.315	-384.713	0.000
	3:WIND Z	0.000	-582.430	-604.132	-571.178	-549.476	-604.132	0.000
		0.444	-581.304	-598.666	-572.303	-554.942	-598.666	0.000
		0.887	-580.179	-593.201	-573.429	-560.407	-593.201	0.000
		1.331	-579.054	-587.735	-574.554	-565.873	-587.735	0.000
		1.775	-577.929	-582.269	-575.679	-571.338	-582.269	0.000
		2.219	-576.804	-576.804	-576.804	-576.804	-576.804	0.000
		2.662	-575.679	-571.338	-577.929	-582.269	-582.269	0.000
		3.106	-574.554	-565.873	-579.054	-587.735	-587.735	0.000
		3.550	-573.429	-560.407	-580.179	-593.201	-593.201	0.000
		3.994	-572.303	-554.942	-581.304	-598.666	-598.666	0.000
		4.437	-571.178	-549.476	-582.430	-604.132	-604.132	0.000
22	1:DEAD LOAD	0.000	1.230	-0.315	-1.232	0.314	-1.232	1.230
		0.442	1.033	-0.252	-1.034	0.251	-1.034	1.033
		0.883	0.819	-0.189	-0.820	0.188	-0.820	0.819
		1.325	0.588	-0.126	-0.588	0.126	-0.588	0.588
		1.766	0.339	-0.063	-0.339	0.063	-0.339	0.339
		2.208	0.074	0.000	-0.073	0.000	-0.073	0.074
		2.650	-0.211	0.063	0.212	-0.062	-0.211	0.212
		3.091	-0.514	0.126	0.515	-0.125	-0.514	0.515
		3.533	-0.833	0.189	0.835	-0.188	-0.833	0.835
		3.975	-1.170	0.252	1.172	-0.250	-1.170	1.172
		4.416	-1.524	0.315	1.526	-0.313	-1.524	1.526
	2:WIND LOAD	0.000	-378.242	96.548	383.673	-91.117	-378.242	383.673
		0.442	-302.051	77.782	307.481	-72.351	-302.051	307.481
		0.883	-225.859	59.015	231.290	-53.584	-225.859	231.290
		1.325	-149.668	40.248	155.098	-34.818	-149.668	155.098
		1.766	-73.476	21.482	78.907	-16.051	-73.476	78.907
		2.208	2.715	2.715	2.715	2.715	0.000	2.715
		2.650	78.907	-16.051	-73.476	21.482	-73.476	78.907
		3.091	155.098	-34.818	-149.668	40.248	-149.668	155.098
		3.533	231.290	-53.584	-225.859	59.015	-225.859	231.290
		3.975	307.481	-72.351	-302.051	77.782	-302.051	307.481
		4.416	383.673	-91.117	-378.242	96.548	-378.242	383.673
	3:WIND Z	0.000	49.286	-246.561	-49.649	246.198	-246.561	246.198
		0.442	39.392	-197.285	-39.755	196.922	-197.285	196.922
		0.883	29.499	-148.009	-29.862	147.646	-148.009	147.646
		1.325	19.605	-98.733	-19.968	98.370	-98.733	98.370
		1.766	9.712	-49.457	-10.075	49.094	-49.457	49.094
		2.208	-0.181	-0.181	-0.181	-0.181	-0.181	0.000
		2.650	-10.075	49.094	9.712	-49.457	-49.457	49.094
		3.091	-19.968	98.370	19.605	-98.733	-98.733	98.370
		3.533	-29.862	147.646	29.499	-148.009	-148.009	147.646
		3.975	-39.755	196.922	39.392	-197.285	-197.285	196.922
		4.416	-49.649	246.198	49.286	-246.561	-246.561	246.198
23	1:DEAD LOAD	0.000	1.231	-0.315	-1.232	0.314	-1.232	1.231
		0.442	1.034	-0.252	-1.034	0.251	-1.034	1.034
		0.883	0.819	-0.189	-0.820	0.188	-0.820	0.819
		1.325	0.588	-0.126	-0.588	0.126	-0.588	0.588
		1.767	0.340	-0.063	-0.339	0.063	-0.339	0.340

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		2.208	0.074	0.000	-0.073	0.000	-0.073	0.074
		2.650	-0.211	0.063	0.212	-0.062	-0.211	0.212
		3.092	-0.514	0.126	0.515	-0.125	-0.514	0.515
		3.533	-0.834	0.189	0.835	-0.188	-0.834	0.835
		3.975	-1.170	0.252	1.172	-0.250	-1.170	1.172
		4.416	-1.524	0.315	1.527	-0.313	-1.524	1.527
	2:WIND LOAD	0.000	502.142	-54.977	-506.863	50.256	-506.863	502.142
		0.442	401.242	-44.454	-405.962	39.733	-405.962	401.242
		0.883	300.341	-33.930	-305.062	29.210	-305.062	300.341
		1.325	199.441	-23.407	-204.161	18.686	-204.161	199.441
		1.767	98.540	-12.884	-103.261	8.163	-103.261	98.540
		2.208	-2.360	-2.360	-2.360	-2.360	-2.360	0.000
		2.650	-103.261	8.163	98.540	-12.884	-103.261	98.540
		3.092	-204.161	18.686	199.441	-23.407	-204.161	199.441
		3.533	-305.062	29.210	300.341	-33.930	-305.062	300.341
		3.975	-405.962	39.733	401.242	-44.454	-405.962	401.242
		4.416	-506.863	50.256	502.142	-54.977	-506.863	502.142
	3:WIND Z	0.000	399.225	392.132	-401.548	-394.454	-401.548	399.225
		0.442	319.148	313.473	-321.470	-315.796	-321.470	319.148
		0.883	239.071	234.815	-241.393	-237.137	-241.393	239.071
		1.325	158.993	156.156	-161.316	-158.478	-161.316	158.993
		1.767	78.916	77.498	-81.238	-79.820	-81.238	78.916
		2.208	-1.161	-1.161	-1.161	-1.161	-1.161	0.000
		2.650	-81.238	-79.820	78.916	77.498	-81.238	78.916
		3.092	-161.316	-158.478	158.993	156.156	-161.316	158.993
		3.533	-241.393	-237.137	239.071	234.815	-241.393	239.071
		3.975	-321.470	-315.796	319.148	313.473	-321.470	319.148
		4.416	-401.548	-394.454	399.225	392.132	-401.548	399.225
24	1:DEAD LOAD	0.000	1.231	-0.314	-1.232	0.313	-1.232	1.231
		0.442	1.034	-0.251	-1.035	0.251	-1.035	1.034
		0.883	0.820	-0.188	-0.820	0.188	-0.820	0.820
		1.325	0.588	-0.126	-0.588	0.125	-0.588	0.588
		1.767	0.340	-0.063	-0.339	0.063	-0.339	0.340
		2.208	0.074	0.000	-0.073	0.000	-0.073	0.074
		2.650	-0.211	0.063	0.212	-0.062	-0.211	0.212
		3.092	-0.514	0.126	0.515	-0.125	-0.514	0.515
		3.533	-0.834	0.189	0.835	-0.187	-0.834	0.835
		3.975	-1.171	0.252	1.173	-0.250	-1.171	1.173
		4.416	-1.525	0.315	1.527	-0.313	-1.525	1.527
	2:WIND LOAD	0.000	299.663	477.174	-300.706	-478.218	-478.218	477.174
		0.442	239.626	381.635	-240.669	-382.678	-382.678	381.635
		0.883	179.589	286.096	-180.632	-287.139	-287.139	286.096
		1.325	119.552	190.557	-120.595	-191.600	-191.600	190.557
		1.767	59.515	95.018	-60.559	-96.061	-96.061	95.018
		2.208	-0.522	-0.522	-0.522	-0.522	-0.522	0.000
		2.650	-60.558	-96.061	59.515	95.018	-96.061	95.018
		3.092	-120.595	-191.600	119.552	190.557	-191.600	190.557
		3.533	-180.632	-287.139	179.589	286.096	-287.139	286.096
		3.975	-240.669	-382.678	239.626	381.635	-382.678	381.635
		4.416	-300.706	-478.218	299.663	477.174	-478.218	477.174
	3:WIND Z	0.000	-741.798	235.343	743.776	-233.365	-741.798	743.776
		0.442	-593.241	188.472	595.219	-186.494	-593.241	595.219
		0.883	-444.683	141.602	446.661	-139.623	-444.683	446.661
		1.325	-296.126	94.731	298.104	-92.752	-296.126	298.104

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		1.767	-147.568	47.860	149.547	-45.882	-147.568	149.547
		2.208	0.989	0.989	0.989	0.989	0.000	0.989
		2.650	149.547	-45.882	-147.568	47.860	-147.568	149.547
		3.092	298.104	-92.752	-296.126	94.731	-296.126	298.104
		3.533	446.661	-139.623	-444.683	141.602	-444.683	446.661
		3.975	595.219	-186.494	-593.241	188.472	-593.241	595.219
		4.416	743.776	-233.365	-741.798	235.343	-741.798	743.776
25	1:DEAD LOAD	0.000	0.677	0.384	-0.669	-0.376	-0.669	0.677
		0.561	0.605	0.308	-0.596	-0.300	-0.596	0.605
		1.123	0.511	0.233	-0.502	-0.223	-0.502	0.511
		1.684	0.396	0.157	-0.386	-0.147	-0.386	0.396
		2.246	0.258	0.081	-0.248	-0.071	-0.248	0.258
		2.807	0.099	0.006	-0.088	0.006	-0.088	0.099
		3.369	-0.085	-0.070	0.097	0.082	-0.085	0.097
		3.930	-0.291	-0.146	0.303	0.158	-0.291	0.303
		4.491	-0.519	-0.222	0.532	0.235	-0.519	0.532
		5.053	-0.768	-0.297	0.782	0.311	-0.768	0.782
		5.614	-1.040	-0.373	1.054	0.387	-1.040	1.054
	2:WIND LOAD	0.000	-91.133	-237.612	102.154	248.633	-237.612	248.633
		0.561	-71.805	-188.988	82.825	200.009	-188.988	200.009
		1.123	-52.476	-140.363	63.497	151.384	-140.363	151.384
		1.684	-33.147	-91.739	44.168	102.759	-91.739	102.759
		2.246	-13.818	-43.114	24.839	54.135	-43.114	54.135
		2.807	5.510	5.510	5.510	5.510	0.000	5.510
		3.369	24.839	54.135	-13.818	-43.114	-43.114	54.135
		3.930	44.168	102.759	-33.147	-91.739	-91.739	102.759
		4.491	63.497	151.384	-52.476	-140.363	-140.363	151.384
		5.053	82.825	200.009	-71.805	-188.988	-188.988	200.009
		5.614	102.154	248.633	-91.133	-237.612	-237.612	248.633
	3:WIND Z	0.000	461.688	57.828	-488.408	-84.548	-488.408	461.688
		0.561	366.678	43.590	-393.398	-70.310	-393.398	366.678
		1.123	271.669	29.353	-298.389	-56.073	-298.389	271.669
		1.684	176.659	15.115	-203.379	-41.835	-203.379	176.659
		2.246	81.650	0.878	-108.370	-27.598	-108.370	81.650
		2.807	-13.360	-13.360	-13.360	-13.360	-13.360	0.000
		3.369	-108.369	-27.598	81.650	0.878	-108.369	81.650
		3.930	-203.379	-41.835	176.659	15.115	-203.379	176.659
		4.491	-298.389	-56.073	271.669	29.353	-298.389	271.669
		5.053	-393.398	-70.310	366.678	43.590	-393.398	366.678
		5.614	-488.408	-84.548	461.688	57.828	-488.408	461.688
26	1:DEAD LOAD	0.000	-1.040	0.387	1.054	-0.373	-1.040	1.054
		0.561	-0.768	0.311	0.782	-0.297	-0.768	0.782
		1.123	-0.519	0.235	0.532	-0.222	-0.519	0.532
		1.684	-0.291	0.158	0.303	-0.146	-0.291	0.303
		2.246	-0.085	0.082	0.097	-0.070	-0.085	0.097
		2.807	0.099	0.006	-0.088	0.006	-0.088	0.099
		3.369	0.258	-0.071	-0.248	0.081	-0.248	0.258
		3.930	0.396	-0.147	-0.386	0.157	-0.386	0.396
		4.491	0.511	-0.223	-0.502	0.233	-0.502	0.511
		5.053	0.605	-0.300	-0.596	0.308	-0.596	0.605
		5.614	0.677	-0.376	-0.669	0.384	-0.669	0.677
	2:WIND LOAD	0.000	-427.616	49.842	406.133	-71.325	-427.616	406.133
		0.561	-344.241	37.725	322.758	-59.208	-344.241	322.758
		1.123	-260.866	25.609	239.383	-47.091	-260.866	239.383

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		1.684	-177.491	13.492	156.008	-34.975	-177.491	156.008
		2.246	-94.116	1.375	72.633	-22.858	-94.116	72.633
		2.807	-10.741	-10.741	-10.741	-10.741	-10.741	0.000
		3.369	72.633	-22.858	-94.116	1.375	-94.116	72.633
		3.930	156.008	-34.975	-177.491	13.492	-177.491	156.008
		4.491	239.383	-47.091	-260.866	25.609	-260.866	239.383
		5.053	322.758	-59.208	-344.241	37.725	-344.241	322.758
		5.614	406.133	-71.325	-427.616	49.842	-427.616	406.133
	3:WIND Z	0.000	67.118	641.255	-84.579	-638.716	-638.716	641.255
		0.561	53.948	513.258	-51.409	-510.719	-510.719	513.258
		1.123	40.779	385.261	-38.240	-382.722	-382.722	385.261
		1.684	27.609	257.264	-25.070	-254.725	-254.725	257.264
		2.246	14.439	129.267	-11.900	-126.728	-126.728	129.267
		2.807	1.269	1.269	1.269	1.269	0.000	1.269
		3.369	-11.900	-126.728	14.439	129.267	-126.728	129.267
		3.930	-25.070	-254.725	27.609	257.264	-254.725	257.264
		4.491	-38.240	-382.722	40.779	385.261	-382.722	385.261
		5.053	-51.409	-510.719	53.948	513.258	-510.719	513.258
		5.614	-64.579	-638.716	67.118	641.255	-638.716	641.255
27	1:DEAD LOAD	0.000	-1.040	0.387	1.054	-0.373	-1.040	1.054
		0.561	-0.768	0.311	0.782	-0.297	-0.768	0.782
		1.123	-0.519	0.235	0.532	-0.222	-0.519	0.532
		1.684	-0.291	0.158	0.303	-0.146	-0.291	0.303
		2.246	-0.085	0.082	0.097	-0.070	-0.085	0.097
		2.807	0.099	0.006	-0.088	0.006	-0.088	0.099
		3.369	0.258	-0.071	-0.248	0.081	-0.248	0.258
		3.930	0.396	-0.147	-0.386	0.157	-0.386	0.396
		4.491	0.511	-0.223	-0.502	0.233	-0.502	0.511
		5.053	0.605	-0.300	-0.596	0.308	-0.596	0.605
		5.614	0.677	-0.376	-0.669	0.384	-0.669	0.677
	2:WIND LOAD	0.000	204.752	286.152	-193.148	-274.548	-274.548	286.152
		0.561	164.962	230.082	-153.358	-218.478	-218.478	230.082
		1.123	125.172	174.012	-113.568	-162.408	-162.408	174.012
		1.684	85.382	117.942	-73.778	-106.338	-106.338	117.942
		2.246	45.592	61.872	-33.988	-50.268	-50.268	61.872
		2.807	5.802	5.802	5.802	5.802	0.000	5.802
		3.369	-33.988	-50.268	45.592	61.872	-50.268	61.872
		3.930	-73.778	-106.338	85.382	117.942	-106.338	117.942
		4.491	-113.568	-162.408	125.172	174.012	-162.408	174.012
		5.053	-153.358	-218.478	164.962	230.082	-218.478	230.082
		5.614	-193.148	-274.548	204.752	286.152	-274.548	286.152
	3:WIND Z	0.000	395.332	16.590	-370.966	7.775	-370.966	395.332
		0.561	318.702	15.709	-294.336	8.657	-294.336	318.702
		1.123	242.072	14.827	-217.706	9.538	-217.706	242.072
		1.684	165.442	13.946	-141.077	10.420	-141.077	165.442
		2.246	88.813	13.064	-64.447	11.301	-64.447	88.813
		2.807	12.183	12.183	12.183	12.183	0.000	12.183
		3.369	-64.447	11.301	88.813	13.064	-64.447	88.813
		3.930	-141.077	10.420	165.442	13.946	-141.077	165.442
		4.491	-217.706	9.538	242.072	14.827	-217.706	242.072
		5.053	-294.336	8.657	318.702	15.709	-294.336	318.702
		5.614	-370.966	7.775	395.332	16.590	-370.966	395.332
28	1:DEAD LOAD	0.000	-0.565	1.138	0.596	-1.107	-1.107	1.138
		0.631	-0.380	0.913	0.410	-0.883	-0.883	0.913

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		1.262	-0.218	0.688	0.248	-0.659	-0.659	0.688
		1.892	-0.081	0.463	0.110	-0.435	-0.435	0.463
		2.523	0.031	0.238	-0.003	-0.211	-0.211	0.238
		3.154	0.119	0.014	-0.091	0.014	-0.091	0.119
		3.785	0.178	-0.211	-0.152	0.238	-0.211	0.238
		4.415	0.214	-0.436	-0.188	0.462	-0.436	0.462
		5.046	0.224	-0.661	-0.199	0.686	-0.661	0.686
		5.677	0.211	-0.886	-0.186	0.910	-0.886	0.910
		6.308	0.172	-1.111	-0.149	1.134	-1.111	1.134
	2:WIND LOAD	0.000	-164.019	-26.685	122.736	-14.599	-164.019	122.736
		0.631	-135.344	-25.476	94.060	-15.808	-135.344	94.060
		1.262	-106.668	-24.268	65.385	-17.016	-106.668	65.385
		1.892	-77.993	-23.059	36.709	-18.225	-77.993	36.709
		2.523	-49.317	-21.850	8.034	-19.433	-49.317	8.034
		3.154	-20.642	-20.642	-20.642	-20.642	-20.642	0.000
		3.785	8.034	-19.433	-49.317	-21.850	-49.317	8.034
		4.415	36.709	-18.225	-77.993	-23.059	-77.993	36.709
		5.046	65.385	-17.016	-106.668	-24.268	-106.668	65.385
		5.677	94.060	-15.808	-135.344	-25.476	-135.344	94.060
		6.308	122.736	-14.599	-164.019	-26.685	-164.019	122.736
	3:WIND Z	0.000	-173.164	239.507	151.387	-261.285	-261.285	239.507
		0.631	-140.709	189.428	118.932	-211.206	-211.206	189.428
		1.262	-108.254	139.349	86.476	-161.126	-161.126	139.349
		1.892	-75.799	89.270	54.021	-111.047	-111.047	89.270
		2.523	-43.344	39.191	21.566	-60.968	-60.968	39.191
		3.154	-10.889	-10.889	-10.889	-10.889	-10.889	0.000
		3.785	21.566	-60.968	-43.344	39.191	-60.968	39.191
		4.415	54.021	-111.047	-75.799	89.270	-111.047	89.270
		5.046	86.476	-161.126	-108.254	139.349	-161.126	139.349
		5.677	118.932	-211.206	-140.709	189.428	-211.206	189.428
		6.308	151.387	-261.285	-173.164	239.507	-261.285	239.507
29	1:DEAD LOAD	0.000	-0.565	1.138	0.596	-1.107	-1.107	1.138
		0.631	-0.380	0.913	0.410	-0.883	-0.883	0.913
		1.262	-0.218	0.688	0.248	-0.659	-0.659	0.688
		1.892	-0.081	0.463	0.110	-0.435	-0.435	0.463
		2.523	0.031	0.238	-0.003	-0.211	-0.211	0.238
		3.154	0.119	0.014	-0.091	0.014	-0.091	0.119
		3.785	0.178	-0.211	-0.152	0.238	-0.211	0.238
		4.415	0.214	-0.436	-0.188	0.462	-0.436	0.462
		5.046	0.224	-0.661	-0.199	0.686	-0.661	0.686
		5.677	0.211	-0.886	-0.186	0.910	-0.886	0.910
		6.308	0.172	-1.111	-0.149	1.134	-1.111	1.134
	2:WIND LOAD	0.000	-32.488	192.764	42.382	-182.870	-182.870	192.764
		0.631	-25.001	155.201	34.895	-145.307	-145.307	155.201
		1.262	-17.514	117.637	27.408	-107.743	-107.743	117.637
		1.892	-10.027	80.074	19.921	-70.180	-70.180	80.074
		2.523	-2.540	42.511	12.434	-32.616	-32.616	42.511
		3.154	4.947	4.947	4.947	4.947	0.000	4.947
		3.785	12.434	-32.616	-2.540	42.511	-32.616	42.511
		4.415	19.921	-70.180	-10.027	80.074	-70.180	80.074
		5.046	27.408	-107.743	-17.514	117.637	-107.743	117.637
		5.677	34.895	-145.307	-25.001	155.201	-145.307	155.201
		6.308	42.382	-182.870	-32.488	192.764	-182.870	192.764
	3:WIND Z	0.000	206.228	145.038	-142.621	-81.431	-142.621	206.228

Beam Combined Axial and Bending Stresses Cont...

Beam	L/C	d	Corner 1 (N/mm ²)	Corner 2 (N/mm ²)	Corner 3 (N/mm ²)	Corner 4 (N/mm ²)	Max Tens (N/mm ²)	Max Comp (N/mm ²)
		0.631	171.343	122.391	-107.736	-58.784	-107.736	171.343
		1.262	136.459	99.745	-72.851	-36.137	-72.851	136.459
		1.892	101.574	77.098	-37.966	-13.490	-37.966	101.574
		2.523	66.689	54.451	-3.081	9.157	-3.081	66.689
		3.154	31.804	31.804	31.804	31.804	0.000	31.804
		3.785	-3.081	9.157	66.689	54.451	-3.081	66.689
		4.415	-37.966	-13.490	101.574	77.098	-37.966	101.574
		5.046	-72.851	-36.137	136.459	99.745	-72.851	136.459
		5.677	-107.736	-58.784	171.344	122.391	-107.736	171.344
		6.308	-142.621	-81.431	206.228	145.038	-142.621	206.228
30	1:DEAD LOAD	0.000	0.172	1.134	-0.149	-1.111	-1.111	1.134
		0.631	0.211	0.910	-0.186	-0.886	-0.886	0.910
		1.262	0.224	0.686	-0.199	-0.661	-0.661	0.686
		1.892	0.214	0.462	-0.188	-0.436	-0.436	0.462
		2.523	0.178	0.238	-0.152	-0.211	-0.211	0.238
		3.154	0.119	0.014	-0.091	0.014	-0.091	0.119
		3.785	0.031	-0.211	-0.003	0.238	-0.211	0.238
		4.415	-0.081	-0.435	0.110	0.463	-0.435	0.463
		5.046	-0.218	-0.659	0.248	0.688	-0.659	0.688
		5.677	-0.380	-0.883	0.410	0.913	-0.883	0.913
		6.308	-0.565	-1.107	0.596	1.138	-1.107	1.138
	2:WIND LOAD	0.000	-107.462	14.537	139.287	17.289	-107.462	139.287
		0.631	-82.787	14.812	114.612	17.014	-82.787	114.612
		1.262	-58.112	15.087	89.937	16.738	-58.112	89.937
		1.892	-33.437	15.362	65.263	16.463	-33.437	65.263
		2.523	-8.762	15.638	40.588	16.188	-8.762	40.588
		3.154	15.913	15.913	15.913	15.913	0.000	15.913
		3.785	40.588	16.188	-8.762	15.638	-8.762	40.588
		4.415	65.263	16.463	-33.437	15.362	-33.437	65.263
		5.046	89.937	16.738	-58.112	15.087	-58.112	89.937
		5.677	114.612	17.014	-82.787	14.812	-82.787	114.612
		6.308	139.287	17.289	-107.462	14.537	-107.462	139.287
	3:WIND Z	0.000	92.650	-70.777	-134.473	28.954	-134.473	92.650
		0.631	69.938	-60.804	-111.760	18.981	-111.760	69.938
		1.262	47.225	-50.831	-89.048	9.008	-89.048	47.225
		1.892	24.513	-40.858	-66.336	-0.965	-66.336	24.513
		2.523	1.801	-30.885	-43.624	-10.938	-43.624	1.801
		3.154	-20.911	-20.911	-20.911	-20.911	-20.911	0.000
		3.785	-43.624	-10.938	1.801	-30.885	-43.624	1.801
		4.415	-66.336	-0.965	24.513	-40.858	-66.336	24.513
		5.046	-89.048	9.008	47.225	-50.831	-89.048	47.225
		5.677	-111.760	18.981	69.938	-60.804	-111.760	69.938
		6.308	-134.473	28.954	92.650	-70.777	-134.473	92.650

Conclusion

This analysis was done to know about the stress distribution in the members. Knowledge about stress distribution would help to know about the most probable points of failure. Although being load

carrying structures, tensegrity structures rarely fail due to member failure. Also this can be concluded that wind loads do not affect the structure a lot as the geometry of this structure makes the wind pass through it.

There is great potential of the combination of bamboo and tensegrity in the construction industry. The fabricated structure aims to provide an alternative environment friendly construction for a steel poultry shed. It can serve multiple purposes, such as workshop for a cottage industry, warehouse, and other medium industries. Not only is the structure light compared to conventional steel, it is at the same time several times cheaper and ecofriendly. Such structures can pave way for sustainable industrialization of the rural sector in India and other developing nations.

For fine tuning of the structure after the erection has been done, it is recommended to use turnbuckle on each kind of cable so that adjustments can be distributed over whole body of the structure and are not just confined to upper layer.

Future Scope

Field of Tensegrity structures has a great scope of both research and real time usage. The structures that we analyzed could further be worked on and can be subjected to various other loadings like the seismic loads, snow loads, etc. There are many other structures like sheds and bridges that can be constructed using concept of tensegrity. Also these structures can be made more sustainable and eco-friendly.

The structure can and should also be analyzed using various other software such as Rhinoceros and SAP2000. Also static analysis can be performed on these structures.

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