STAAD Pro Solution Steps

Methods of Analysis:

- **A- Edit Commands Lines Method**
- **B-** Graphical Method

1. Modeling



2.Loading



3.Analyzing :

- Elastic Analysis
- P-Delta Analysis
- Buckling Analysis
- Cable Analysis

4.Reading Results :

- Tables results
- Graphical results

1. Modeling

A. <u>Geometrical Layout :</u>

i. Tables :

Structure1 - Whole Structure	🔲 Structure1 - Nodes 📃 🗖 🔀						🔲 💻 Structure1 - Beams 📃 🗖						
3	Node	X	Y	Z		Beam	Node A	Node B	Property Refn.	м			
2	1	0.000	0.000	0.000		1	1	2	1				
2	2	0.000	5.000	0.000		2	2	3	3	CON			
2	3	6.000	5.000	0.000		3	3	4	2	CON			
3	4	6.000	0.000	0.000		4							
Ĩ	5												
1													
4													
zx 1						<				>			

ii. <u>Grid (Linear, Radial, Irregular)</u> - Snap Node/Beam





C. <u>Material Constants :</u>

(step1-Define Material \rightarrow step2 – Assign Material)

i. Density

3

- ii. Elasticity
- iii. Poisson's Ratio
- iv. Alpha (Coefficient of Thermal Expansion) of the materials

Default Material Constants :

E Structure1 - Materials										
Name	E kN/mm2	Poisson's Ratio	Density kg/m3	Alpha @/%						
STEEL	205.000	300E-3	7833.413	12E-6						
ALUMINUM	68.948	330E-3	2712.631	23E-6						
CONCRETE	21.718	170E-3	2402.616	10E-6						

 \rightarrow

D.<u>Supports</u> :

(step1-Define Supports

step2 – Assign Supports)



- i. Fixed (restrained in all 6 degrees of freedom)
- ii. Pinned (restrained in all three translational degrees of freedom and free in the 3 rotational degrees of freedom)
- iii. Fixed But (create various types of roller, hinge and spring supports with specified restrained degrees of freedom)
- iv. Enforced (same as a Fixed support except that the restrained degrees of freedom are defined in terms of being stiff springs)
 - v. Enforced But (same as the "Enforced" support except that we have a choice on the degrees of freedom we wish to restrain)
- vi. Multi Linear Spring (allows the user to model the support type for which the resistance offered to external loads varies with the extent of deformation of the support node)
- vii. Foundation (create spring supports for independent footings and mat foundations)
- viii. Inclined (create supports that offer restraints in an axis system that is inclined with respect to the global axis system)

2.Loading

- i. Self weight
- ii. Nodal Load
- iii. Member load



- vii. Temperature Load
- viii. Seismic Load
 - ix. Wind Load

X.



STAAD Analysis and Design Release: 2007 Build: 1 Design Codes: All Codes Free Disk Space: 1004256 KB Input File: Structurel.std ++ Processing Joint Coordinates. 22: 5:47 ++ Processing Member Information. ++ Reading Member Properties 9 sec ++ Processing Support Condition. 22: 5:50 => Use Out-of-Core Bait Solver ++ Processing Element Stiffness Matrix. 22: 5:51 ++ Processing Element Stiffness Matrix. 0 sec ++ Calculating Joint Displacements. 22: 5:51 ++ Finished Processing Global Stiffness Matrix. 0 sec ++ Calculating Joint Displacements. 22: 5:51 ++ Creating Member Forces. 22: 5:51 ++ Creating Member Forces. 22: 5:51 ++ Creating Member Forces. 22: 5:51 ++ Creating Reaction File (DSP) 22: 5:51 ++ Creating Reaction File (DSP) 22: 5:51 ++ Consting Member Forces. 22: 5:51 ++ Consting Me	🛓 STAAD Analysis and Design		
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4.Reading Results

i. Tables result

🔲 Str	Structure1 - Node Displacements:													
MA	All Summary /													
Horizontal Vertical Horizontal Resultant Rotational														
Node	L/C	X mm	Y mm	Z mm	mm	rX rad	r¥ rad	rZ rad						
1	1 DL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Ξ					
	2 LL	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
	3 WL	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
	4 DL+LL+WL	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
2	1 DL	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
	2 LL	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
	3 WL	0.000	0.000	0.000	0.000	0.000	0.000	-0.000						
	4 DL+LL+WL	0.000	0.000	0.000	0.000	0.000	0.000	-0.000						
3	1 DL	-0.181	-0.025	0.000	0.183	0.000	0.000	-0.000						
	2 LL	-0.044	-0.004	0.000	0.045	0.000	0.000	-0.000	*					
<								>						

		Summary∖∖	Envelope	/			
		Horizontal	Vertical	Horizontal		Moment	
Node	L/C	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
2	1 DL	2.372	35.551	0.000	0.000	0.000	0.000
	2 LL	0.692	4.127	0.000	0.000	0.000	0.000
	3 WL	-1.473	-2.703	0.000	0.000	0.000	0.000
	4 DL+LL+WL	1.891	45.482	0.000	0.000	0.000	0.000
5	1 DL	-2.372	40.444	0.000	0.000	0.000	0.491
	2 LL	-0.692	3.873	0.000	0.000	0.000	0.264
	3 WL	-6.527	2.703	0.000	0.000	0.000	15.783
	4 DL+LL+VVL	-13.091	58.513	0.000	0.000	0.000	23.109

nts λ Max S

Mx kNm

0.000

0.000

0.000

0.000

0.000

0.000 0.000

0.000

Mz kNm 0.000 2.372 4.74°

4.743 7.115 9.487

9.467 -0.000 0.692 1.384 2.076 2.768

-0.000 -1.473

Shear Forces J

My kNm 0.000

0.000

0.000

0.000

0.000

0.000

0.000 0.000

0.000 0.000

🔲 Str	ucture1 - B	eam En	d Forces:							🔲 Str	ucture1 - E	eam For	ce Detail:		
	All (Summ	ary∖Envelo	ope/						14	MALA AL	Max Axi	al Forces >	Max Bend	ing Mom
Beam	L/C	Node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm	^	Beam	L/C	Dist m	Fx kN	Fy kN	Fz kN
1	1 DL	2	35.551	-2.372	0.000	0.000	0.000	0.000		1	1 DL	0.000	35.551	-2.372	0.000
		3	-17.046	2.372	0.000	0.000	0.000	-9.487	-			1.000	30.925	-2.372	0.000
	2 LL	2	4.127	-0.692	0.000	0.000	0.000	-0.000				2.000	26.299	-2.372	0.000
		3	-4.127	0.692	0.000	0.000	0.000	-2.768				3.000	21.673	-2.372	0.000
	3 WL	2	-2.703	1.473	0.000	0.000	0.000	-0.000	_			4.000	17.046	-2.372	0.000
		3	2.703	-1.473	0.000	0.000	0.000	5.894			2 LL	0.000	4.127	-0.692	0.000
	4 DL+LL+WL	2	45.482	-1.891	0.000	0.000	0.000	-0.000				1.000	4.127	-0.692	0.000
		3	-23.275	1.891	0.000	0.000	0.000	-7.562				2.000	4.127	-0.692	0.000
2	1 DL	3	2.372	17.046	0.000	0.000	0.000	9.487				3.000	4.127	-0.692	0.000
		4	-2.372	16.882	0.000	0.000	0.000	-8.996				4.000	4.127	-0.692	0.000
	2LL	3	0.692	4.127	0.000	0.000	0.000	2.768			3 WL	0.000	-2.703	1.473	0.000
		4	-0.692	3.873	0.000	0.000	0.000	-2.504	~			1.000	-2.703	1.473	0.00

ii. Graphical Results

