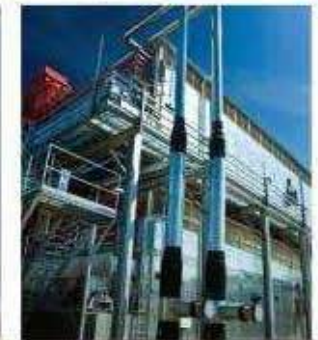
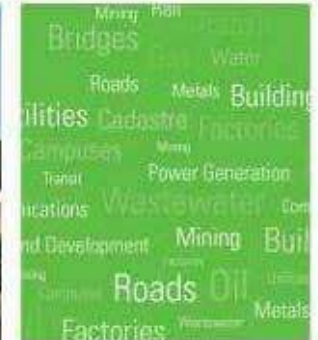
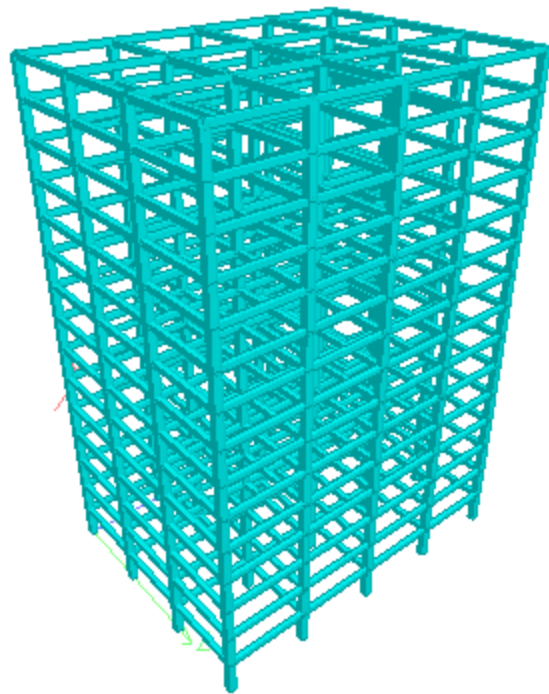


STAAD.Pro

3D Structural Analysis & Design



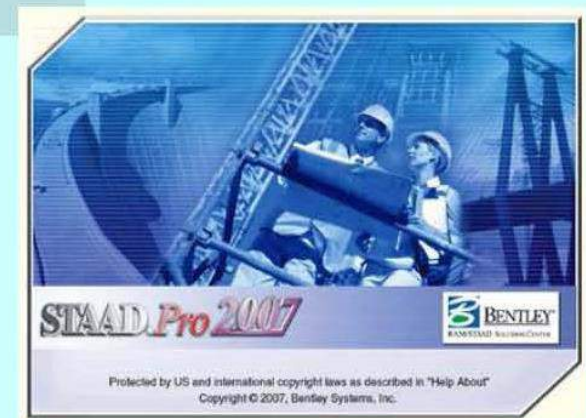
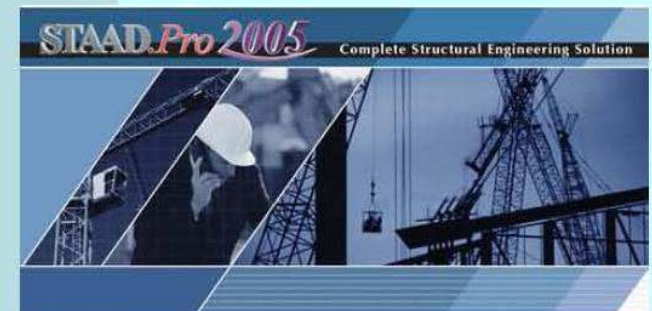
Topics Covered :

- Introduction
- Model Generation
- Geometry Functions
- Properties, Spec & Support
- Loadings
- Analysis & Postprocessing
- Steel Design
- RC Design

STAAD.Pro

3D Structural Analysis & Design

STAAD.Pro is the choice of 47 out of 50 leading Structural Engineering firms, 46 out of 50 state DOTs and 7 out of the top 10 engineering universities.



STAAD.Pro

General purpose software suite for structural engineers involved in analysis and design of structures

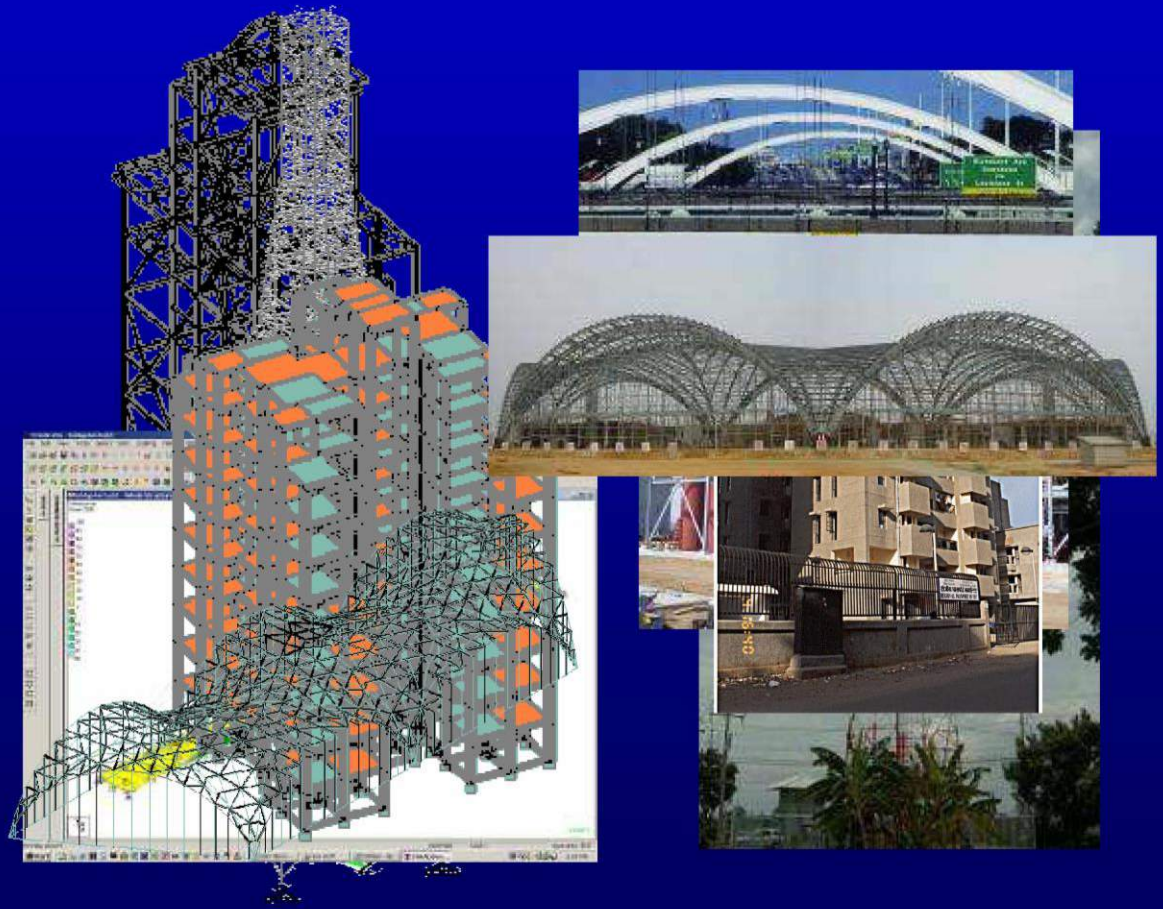
Plants

Towers

Bridges

Buildings

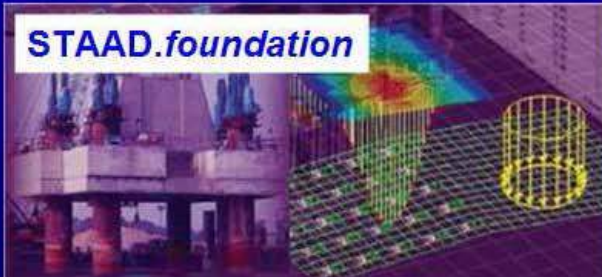
Airports



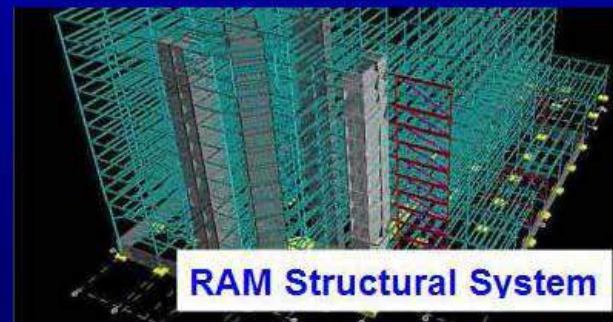
STAAD.Pro Family



- Steel Designer
- Concrete Designer
- RAM Connection
- Advanced Slab Design
- Piping



Design and produce construction Drawings for any foundation type



Special purpose in analysis and design of building structures

WHY STAAD.*Pro*

The world #1 structural analysis and design software.

- **STAAD.*Pro*** was developed for practicing engineers.

- For static, pushover, dynamic, P-delta, buckling or cable analysis, STAAD.*Pro* is the industry standard

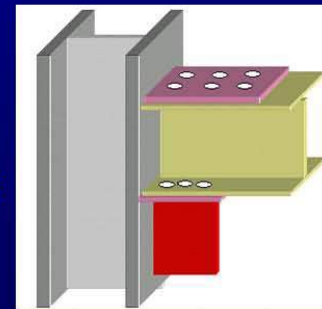
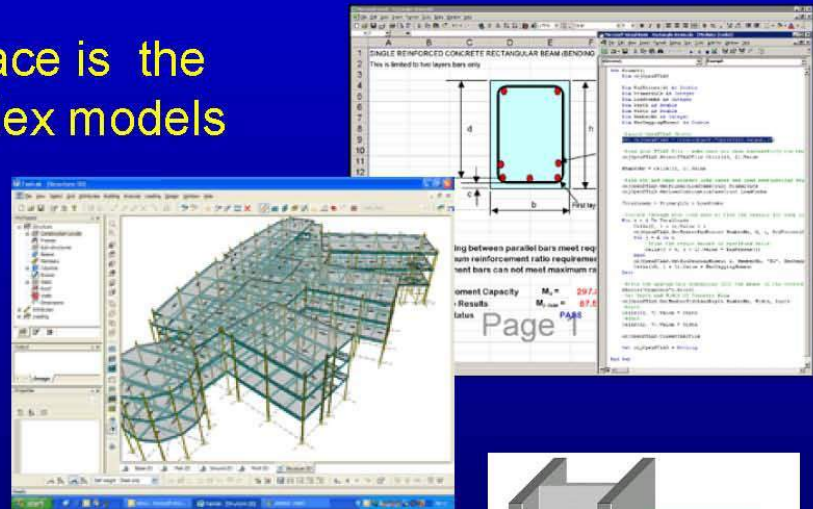


- **STAAD.*Pro*** has design codes for most countries including US, BS, Canada, Russia, Aus, France, India, China, Euro, Japan... **NO THAI?**



WHY STAAD.Pro

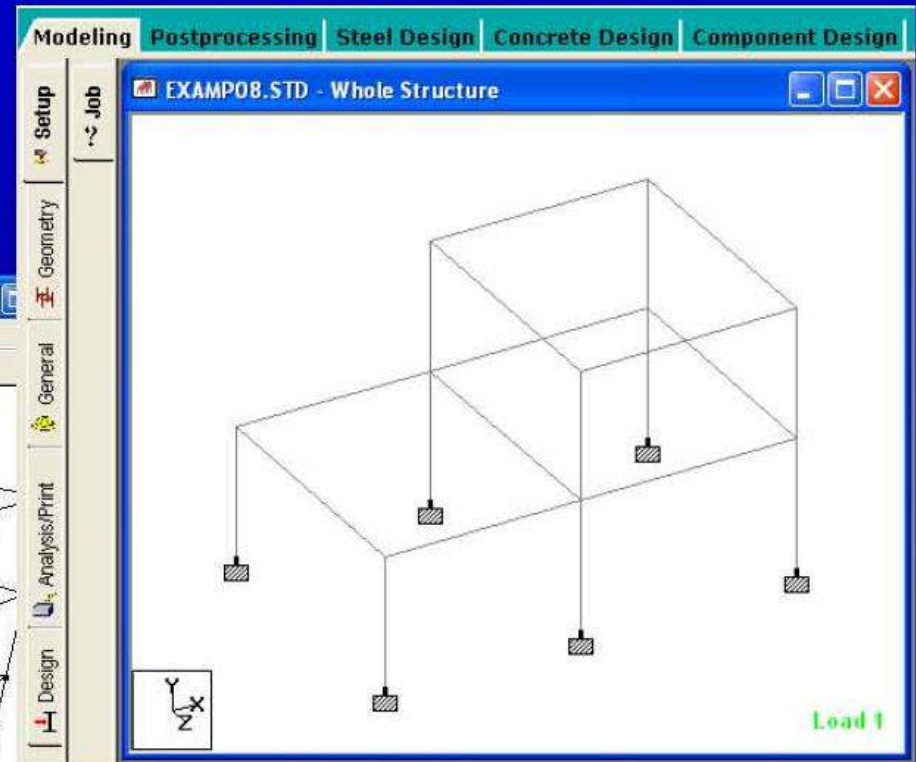
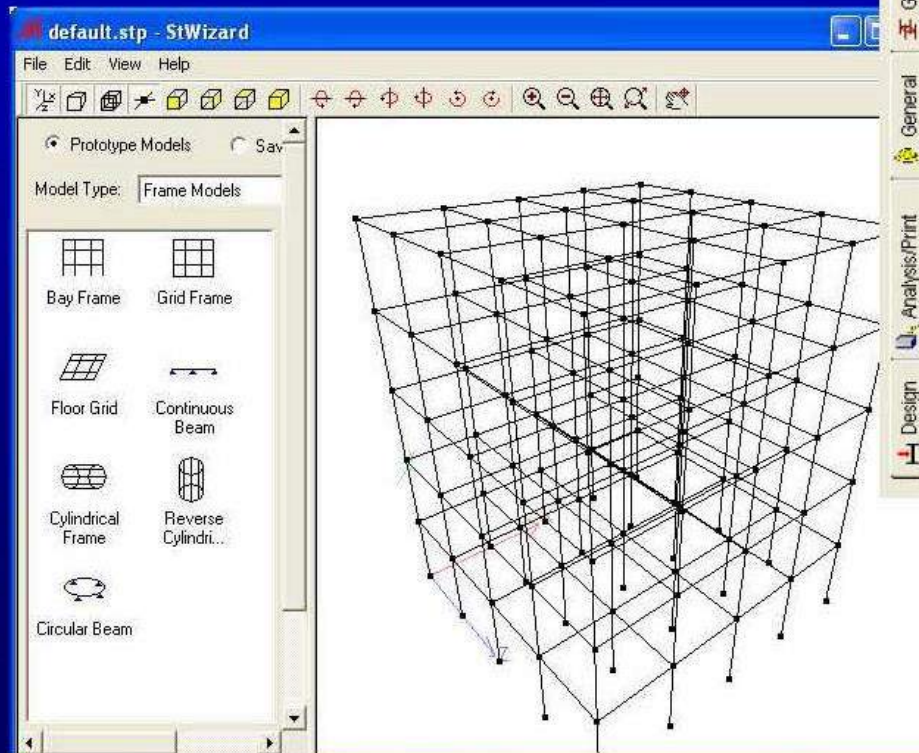
- **STAAD.Pro** is fully COM (Component Object Model). Any 3rd party applications can be used with STAAD.Pro.
- STAAD.Pro's User Interface is the industry standard. Complex models can be easily generated.
- **STAAD.Pro** supports multi-material design codes such as timber, steel, cold-formed steel, concrete and aluminum.

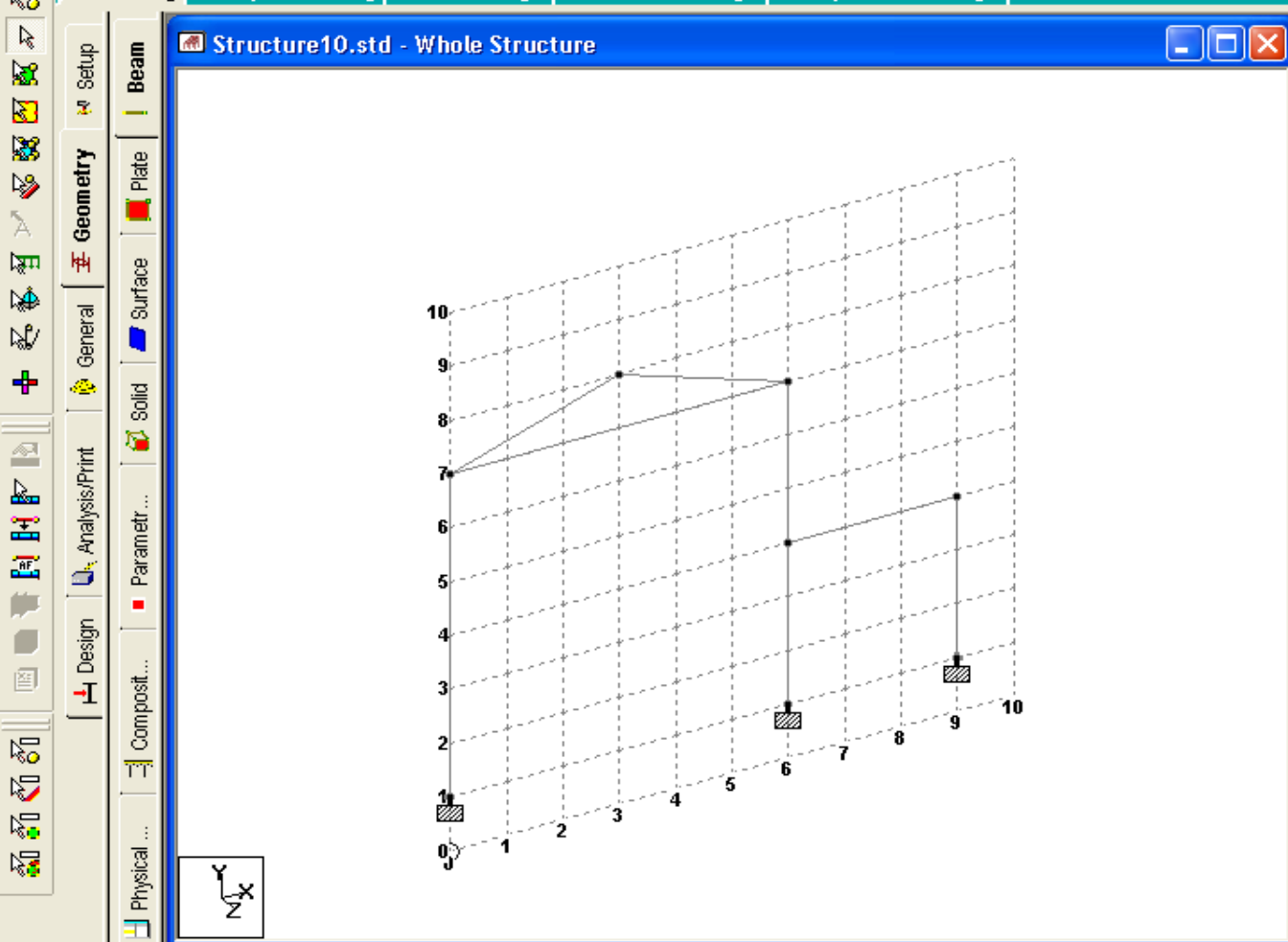


Ease-of-Use

■ Graphical User Interface with tabbed page layout.

■ Structure Wizard





Snap Node/Beam

Linear Radial Irregular

Plane

☒ X-Y ☐ X-Z ☐ Y-Z

Angle of Plane°

☐ X-X ☒ Y-Y ☐ Z-Z

Grid Origin (m)

X Y Z

0 0 0

Construction Lines

Left Right m Skew°

X 0 10 1 0

Y 0 10 1 0

Labels

☐ Local Coordinate ☐ Rel. Coords ☐ Axis Ids Font...

End(s) Freq.

X Start 1 X Y Z

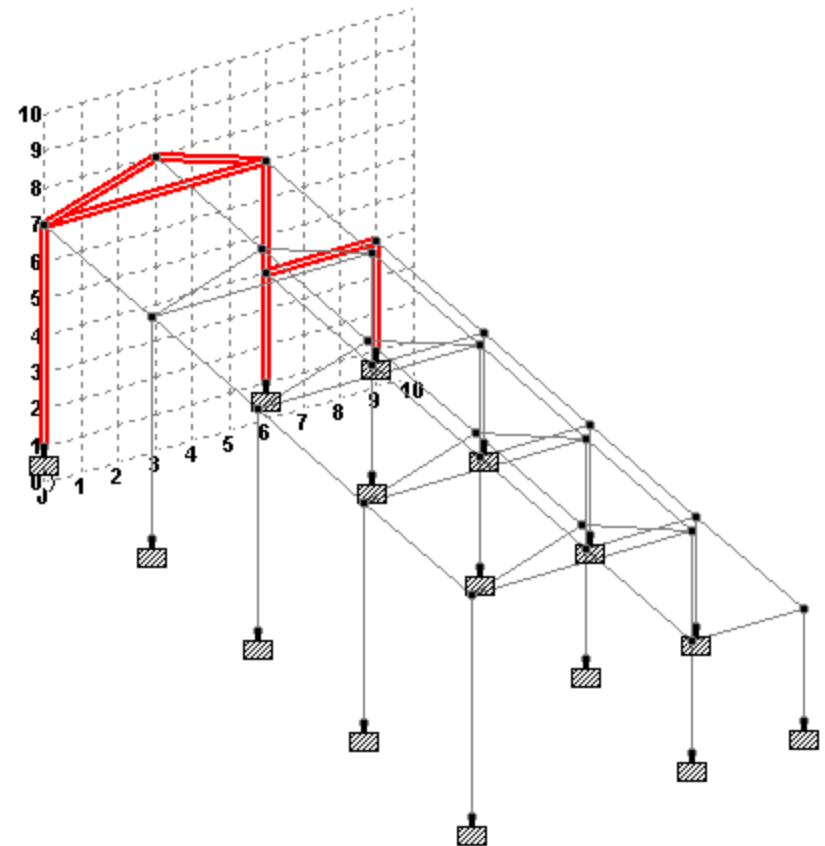
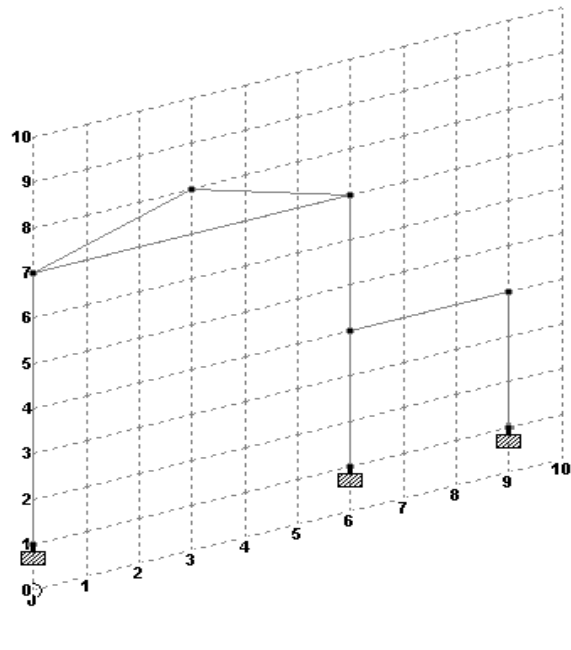
Y Start 1 X Y Z

☒ Snap to existing nodes too

Snap Node/Beam Close

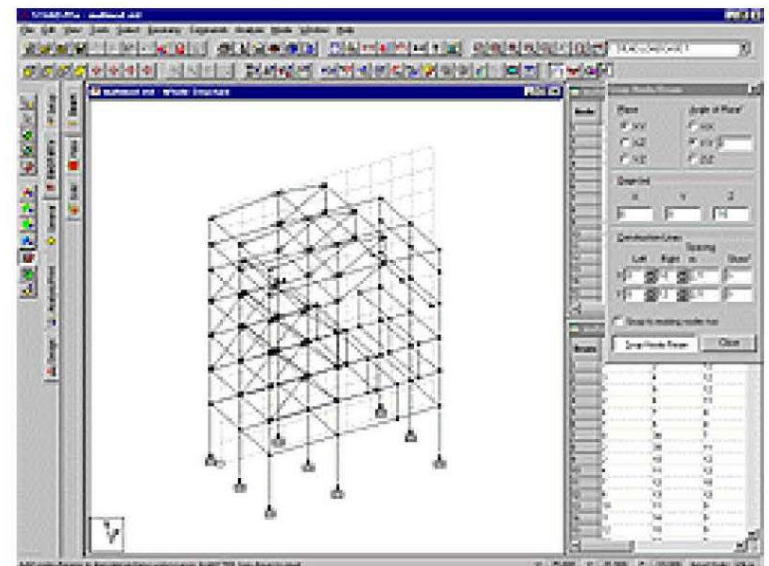
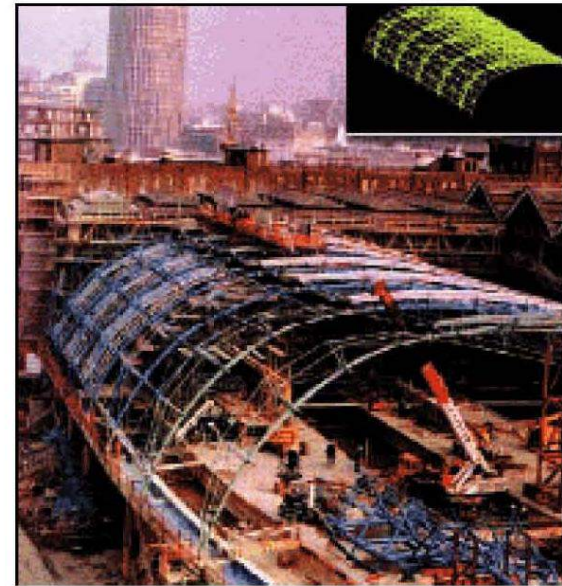
Powerful Graphical Editor

Structure10.std - Whole Structure



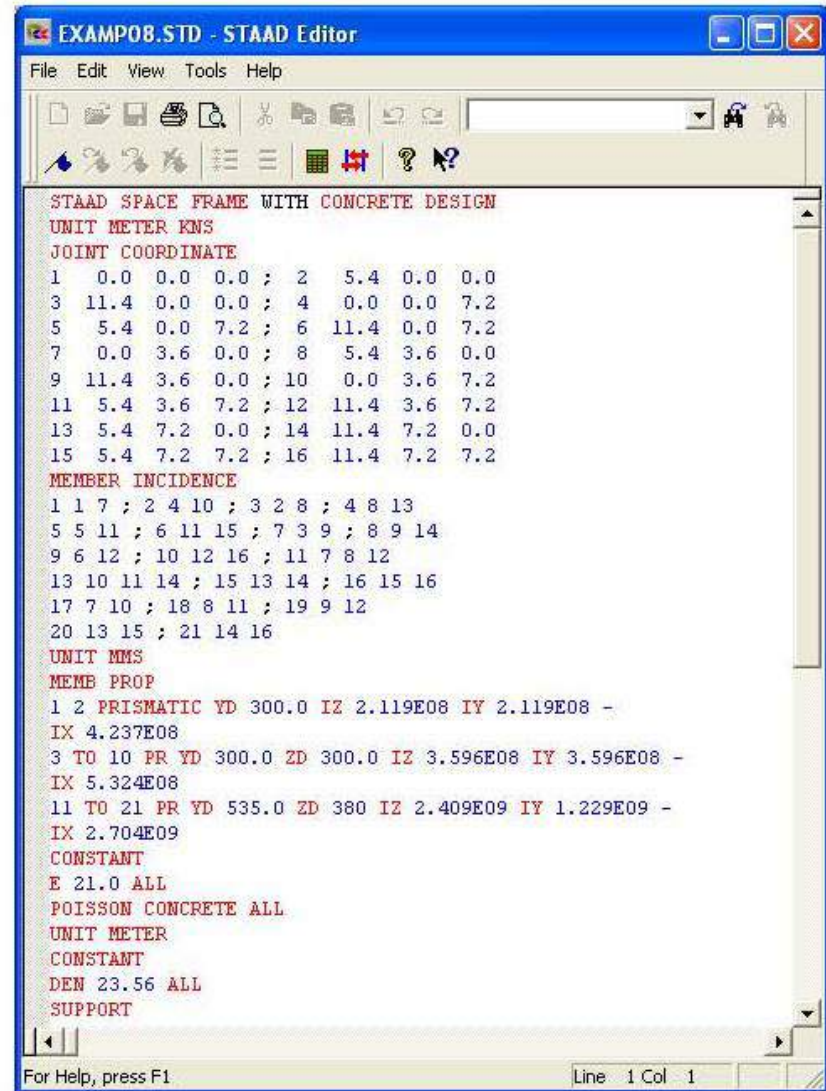
Model Generation

- Create Model using Graphical Environment, Spreadsheet style input, AutoCAD DXF Import etc
- Repeat either translational or circular
- Mirror, Rotate, Copy and Paste
- Remove Duplicate/Orphan Nodes
- Dynamic Zoom Capability
- Create Beams, Plates and Solids
- Offset Members, Semi Rigid Connections, Partial Moment Release



Built-in Command File Editor

- Input file as a text file with extension **.std** created automatically by the program.
- model creation and editing can be done graphically as well as through file editor.
- Command file easy to comprehend due to simple syntax.



The screenshot shows a window titled "EXAMP08.STD - STAAD Editor". The window contains a text editor with the following content:

```
STAAD SPACE FRAME WITH CONCRETE DESIGN
UNIT METER KNS
JOINT COORDINATE
1 0.0 0.0 0.0 ; 2 5.4 0.0 0.0
3 11.4 0.0 0.0 ; 4 0.0 0.0 7.2
5 5.4 0.0 7.2 ; 6 11.4 0.0 7.2
7 0.0 3.6 0.0 ; 8 5.4 3.6 0.0
9 11.4 3.6 0.0 ; 10 0.0 3.6 7.2
11 5.4 3.6 7.2 ; 12 11.4 3.6 7.2
13 5.4 7.2 0.0 ; 14 11.4 7.2 0.0
15 5.4 7.2 7.2 ; 16 11.4 7.2 7.2
MEMBER INCIDENCE
1 1 7 ; 2 4 10 ; 3 2 8 ; 4 8 13
5 5 11 ; 6 11 15 ; 7 3 9 ; 8 9 14
9 6 12 ; 10 12 16 ; 11 7 8 12
13 10 11 14 ; 15 13 14 ; 16 15 16
17 7 10 ; 18 8 11 ; 19 9 12
20 13 15 ; 21 14 16
UNIT MMS
MEMB PROP
1 2 PRISMATIC YD 300.0 IZ 2.119E08 IY 2.119E08 -
IX 4.237E08
3 TO 10 PR YD 300.0 ZD 300.0 IZ 3.596E08 IY 3.596E08 -
IX 5.324E08
11 TO 21 PR YD 535.0 ZD 380 IZ 2.409E09 IY 1.229E09 -
IX 2.704E09
CONSTANT
E 21.0 ALL
POISSON CONCRETE ALL
UNIT METER
CONSTANT
DEN 23.56 ALL
SUPPORT
```

At the bottom of the window, there is a status bar that reads "For Help, press F1" and a line/col indicator showing "Line 1 Col 1".


```
RCFrame.std - STAAD Editor
File Edit View Tools Help

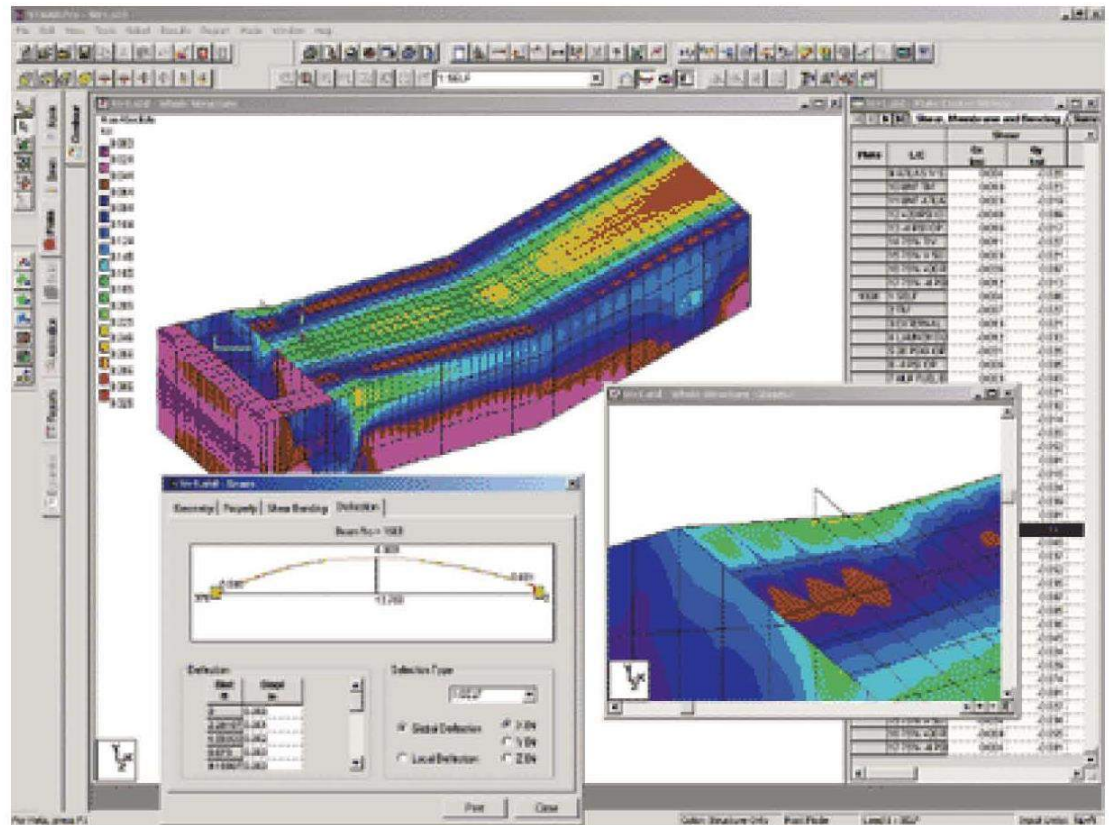
STAAD SPACE
START JOB INFORMATION
ENGINEER DATE 04-May-10
END JOB INFORMATION
INPUT WIDTH 79
UNIT METER MTON
JOINT COORDINATES
1 0 0 0; 2 6 0 0; 3 12 0 0; 4 0 4 0; 5 6 4 0; 6 12 4 0; 7 0 0 6;
8 6 0 6; 9 12 0 6; 10 0 4 6; 11 6 4 6; 12 12 4 6;
MEMBER INCIDENCES
1 4 5; 2 5 6; 3 1 4; 4 2 5; 5 3 6; 6 10 11; 7 11 12; 8 7 10; 9 8 11;
10 9 12; 11 4 10; 12 5 11; 13 6 12;
UNIT CM KG
MEMBER PROPERTY
3 TC 5 8 TC 10 PRIS YD 30 ZD 30
1 2 6 7 11 TC 13 PRIS YD 50 ZD 30
CONSTANTS
E 233928 ALL
DENSITY 0.0024 ALL
POISSON 0.17 ALL
UNIT METER KG
SUPPORTS
1 TC 3 7 TC 9 FIXED
LOAD 1 LOADTYPE None TITLE DEAD LOAD
SELFWEIGHT Y -1 LIST 1 TC 13
FLOOR LOAD
YRANGE 3.5 4.5 FLOAD -300 GY
LOAD 2 LOADTYPE None TITLE LIVE LOAD
FLOOR LOAD
YRANGE 3.5 4.5 FLOAD -400 GY
LOAD 3 LOADTYPE None TITLE WIND LOAD
JOINT LOAD
10 12 FZ -1000
11 FZ -2000
LOAD 4 LOADTYPE None TITLE 1.2DL+1.6LL
REPEAT LOAD
1 1.2 2 1.6
LOAD 5 LOADTYPE None TITLE 1.2DL+LL+1.6W
REPEAT LOAD

For Help, press F1 Line 1 Col 1 NUM
```

- **Job Information**
- **Joint Coordinates**
- **Member Incidences**
- **Member Property**
- **Constants**
- **Supports**
- **Loadings**
- **Analysis**
- **Design**

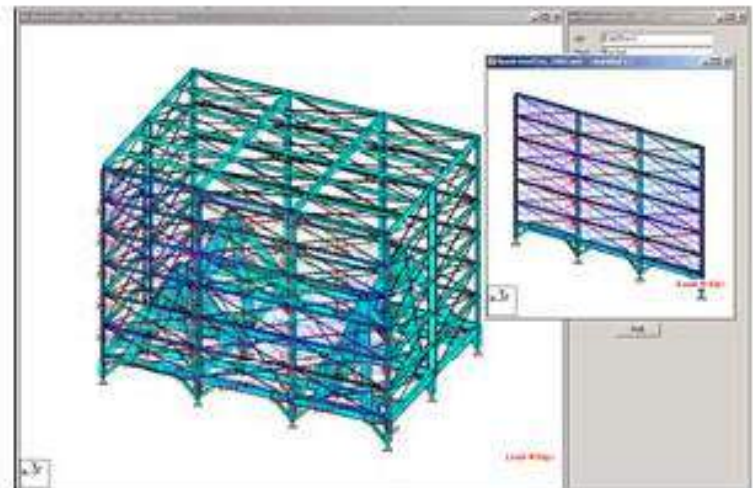
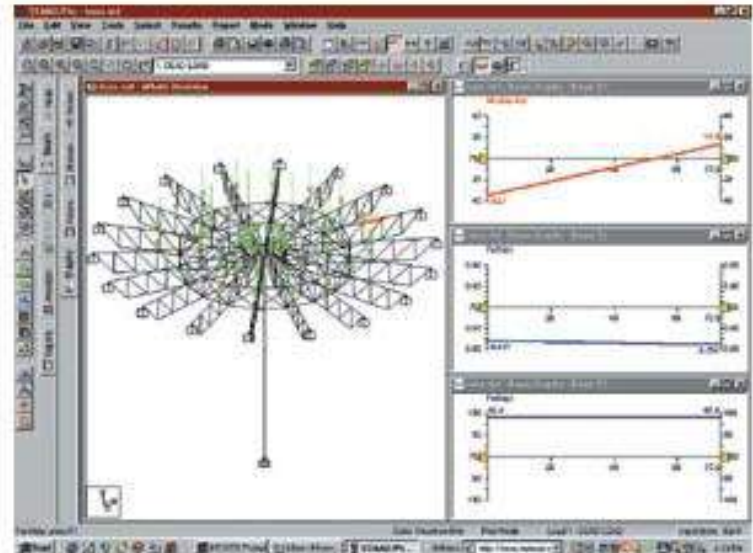
Finite Element Modeling

- Plate Element
- Surface Element
- Solid Element



Load Types and Generation

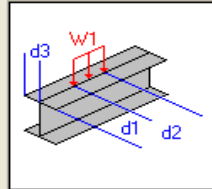
- Categorized load into group types like dead, live, wind, seismic, user-defined.
- Auto-generate load combinations based on standard codes: ACI, AISC, UBC
- Loading: Concentrated, Uniform, Temp., Strain, Support disp., Prestress
- ASCE 7 Wind load generator
- AASHTO Moving Load Generator
- Seismic Load Generator
- Automatic generation of load envelopes



Add New : Load Items

- Selfweight
- Nodal Load
- Member Load
- Uniform Force**
- Uniform Moment
- Concentrated Force
- Concentrated Momer
- Linear Varying
- Trapezoidal
- Hydrostatic
- Pre/Post Stress
- Fixed End
- Physical Member Load
- Area Load
- Floor Load
- Plate Loads
- Surface Loads
- Solid Loads
- Temperature Loads
- Seismic Loads
- Time History
- Wind Load
- Snow Load
- Response Spectra
- Repeat Load
- Frequency

Uniform Force



Force

W1 kN/m

d1 m

d2 m

d3 m

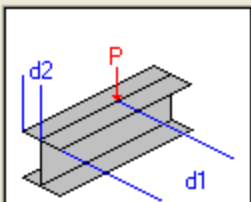
Direction

☐ X (Local) ☐ GX ☐ PX

☐ Y (Local) ☒ GY ☐ PY

☐ Z (Local) ☐ GZ ☐ PZ

Concentrated Force



Force

P kN

d1 m

d2 m

Direction

☐ X (Local) ☐ GX

☒ Y (Local) ☐ GY

☐ Z (Local) ☐ GZ

Floor

☐ XRange ☐ ZRange

☒ YRange ☐ Group

Load

Pressure kN/m2

Direction

☐ Global X

☒ Global Y

☐ Global Z

☐ One Way Distribution

Towards

Range

Define Y Range

Minimum m

Maximum m

Define X Range

Minimum m

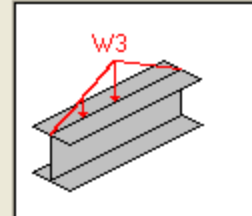
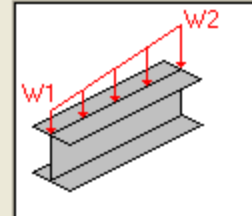
Maximum m

Define Z Range

Minimum m

Maximum m

Linear Varying



Force

W1 kN/m

W2 kN/m

W3 kN/m

Direction

☐ X (Local)

☒ Y (Local)

☐ Z (Local)

Response Spectrum

Code :

☒ Elastic ☐ Design

Combination Method

☒ SRSS ☐ ABS ☐ CQC ☐ ASCE ☐ TEN ☐ CSM

Spectrum Table

Design Ground Acc. :

Behaviour Factor :

SubSoil Class :

Spectrum Type

☒ Acceleration

Interpolation Type

☒ Linear

☐ Logarithmic

Damping Type

☒ Damping

☐ CDAMP

☐ MDAMP

Direction

☐ X

☐ Y

☐ Z

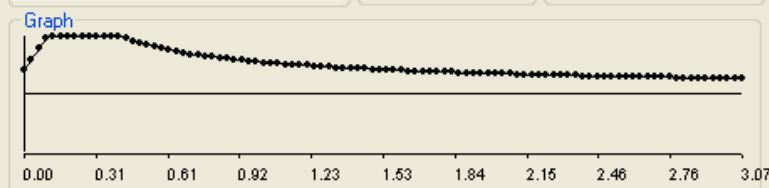
Others

Scale :

☐ Missing Mass

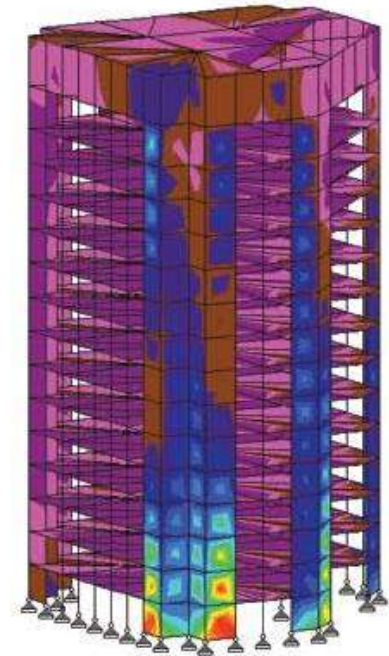
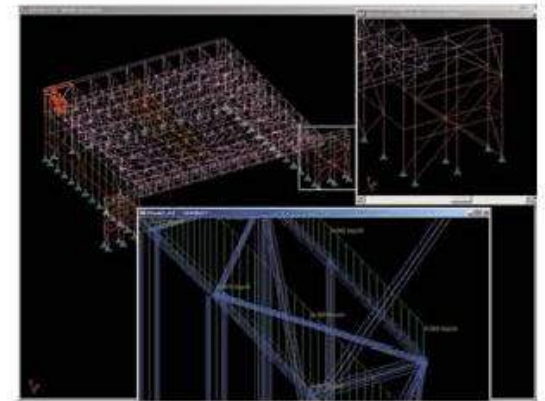
☐ ZPA

	Period	Acc
1	0	1
2	0.031	1.465
3	0.062	1.93
4	0.093	2.395
5	0.124	2.5
6	0.155	2.5
7	0.186	2.5



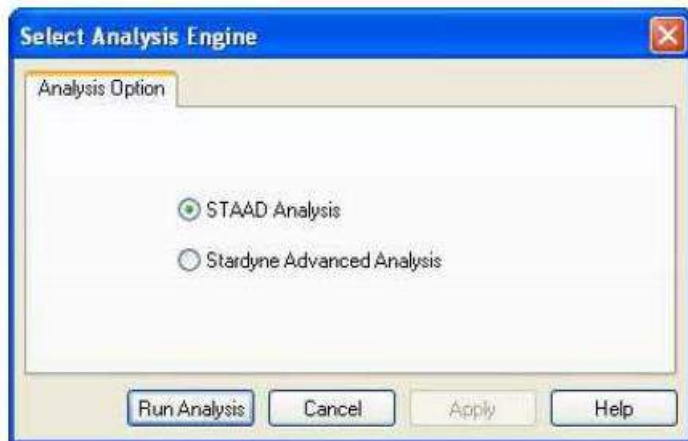
Model Verification

- Multiple zooming and shadow box windows
- New 3D rendering of structure using shading and lighting
- Isometric or any rotations for full 3D viewing
- Display of Loads, Supports, Orientations, Properties, Hidden line removed, Joint/Member numbering, Dimensions, etc.
- Compatible with spreadsheet software such as Microsoft Excel
- Plots of displacement vs. time, velocity vs. time, acceleration vs. time for dynamic analysis
- Single File Archive to save All STAAD Input / Output Files

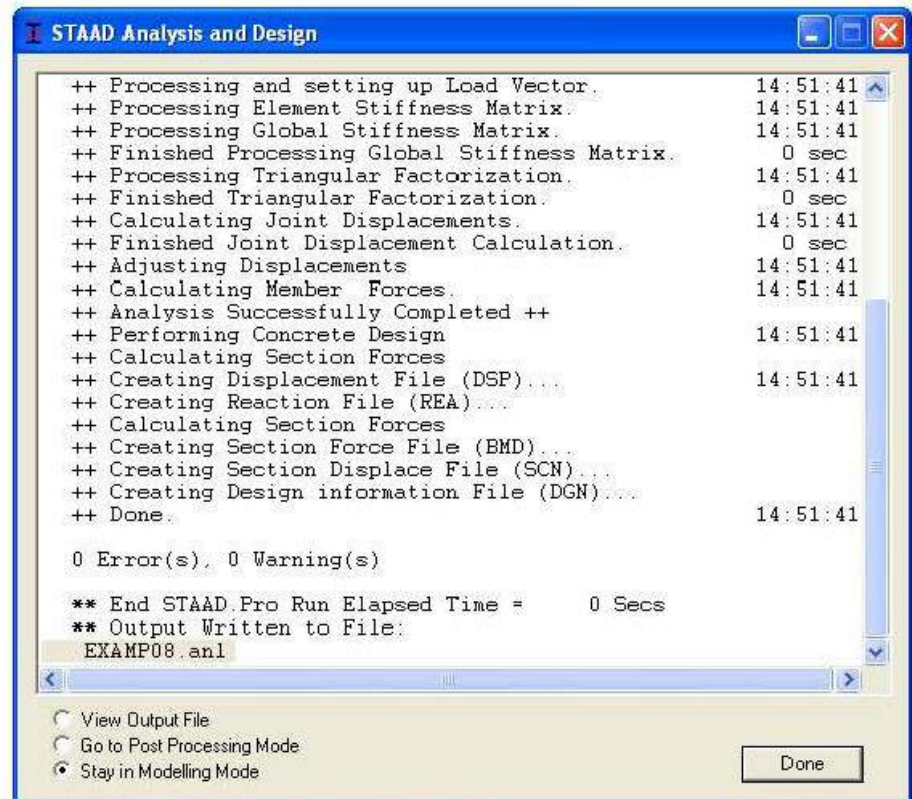


Analysis Capabilities

Powerful analysis and design engines with advanced finite element and dynamic analysis capabilities.



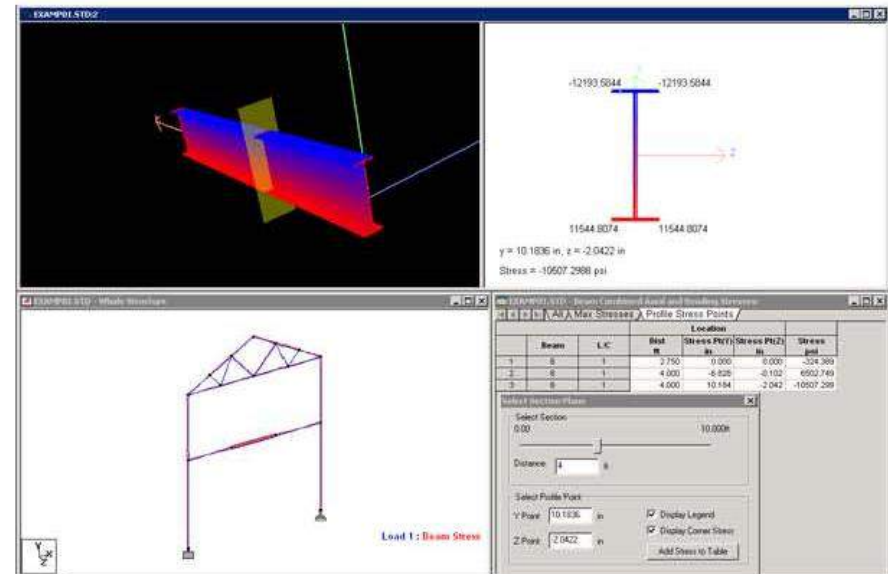
- 2D/3D Static Analysis
- Dynamic/Sesmic Analysis
- Secondary Analysis



Analysis Capabilities

New 2077 Features

- Advanced Analysis Engine
- P-Delta analysis including stress stiffening effects
- P-Delta including small delta
- Modal analysis including stress stiffening
- Buckling load analysis

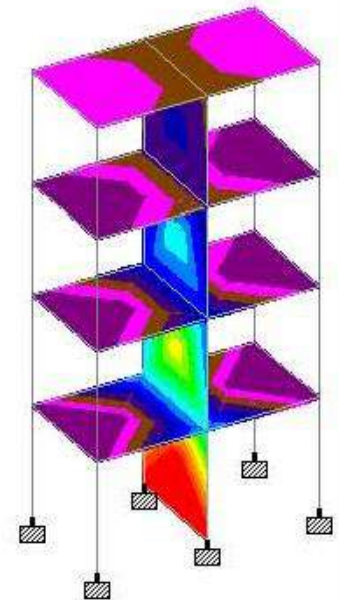
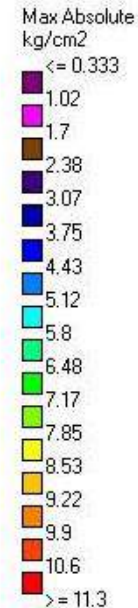
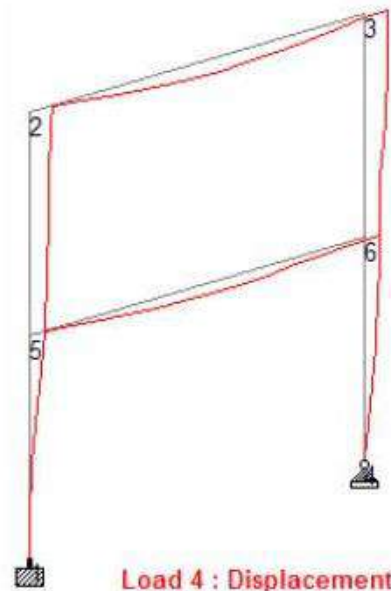
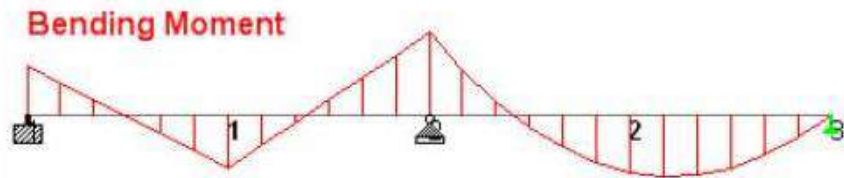
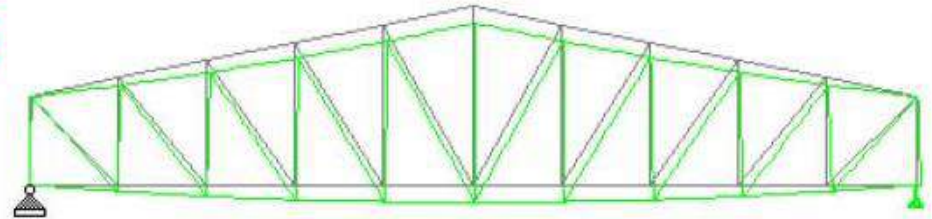


Full buckling analysis to obtain buckling modes and factors for various loading conditions

Result Verification

Post-processing mode:

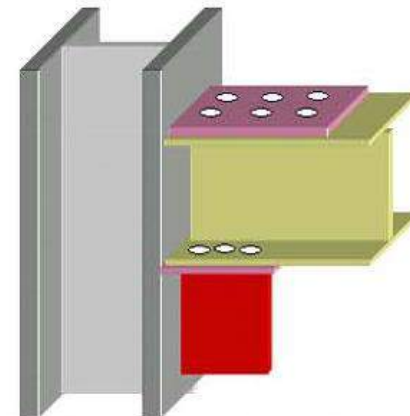
- Output Text File
- Node Displacement
- Force Diagram
- Plate Stress Contour
- Animation
- Reports



Design Codes

Steel Design:

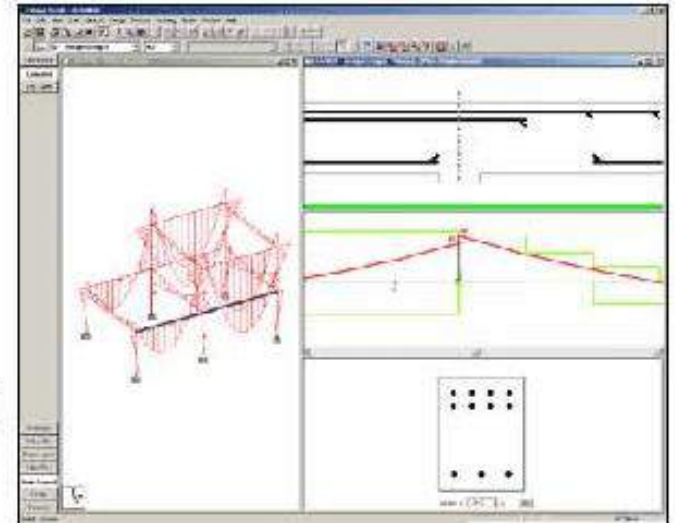
- Design Codes : AISC (ASD/LRFD), AASHTO, BS, Japanese, Chinese, Indian
- Interactive design and report step-by-step calculations.
- Built-in Steel Tables of several countries including AISC, British, Canadian, Australian
- Code Check, Member Selection consisting of Analysis/Design cycles



Design Codes

Concrete Design:

- Two-way slab design to design irregular-shaped slabs. Full reinforcement contour and reinforcement layout plans are created.
- Rectangular concrete shear wall design (with deep beam design).
- Automatic calculation of cracked moment of inertia for concrete design
- Design of Concrete Beam/Column/Slab per ACI 318.
- Numerical and Graphical Design Outputs with reinforcement details
- Interactive concrete design and detailing with bar scheduling and interactive rebar layout



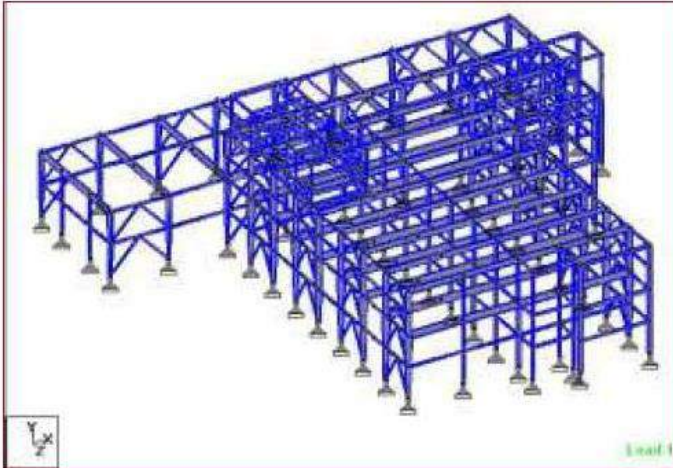
Timber Design

Aluminum Design

User Customized Report Generation



Take a picture



EXAMP08.STD - Whole Structure

Setup Report
Print...
Next Page
Prev Page
Two Page
Zoom In
Zoom Out

Job Information

Engineer	Checked	Approved
Name:		
Date:	23-May-08	

Structure Type: **GFAC FRAME**

Number of Nodes	16	Highest Node	16
Number of Elements	21	Highest Beam	21

Number of Basic Load Cases: 2
Number of Combination Load Cases: 0

Included in this printout are data for:
All The Whole Structure

Included in this printout are results for load cases:

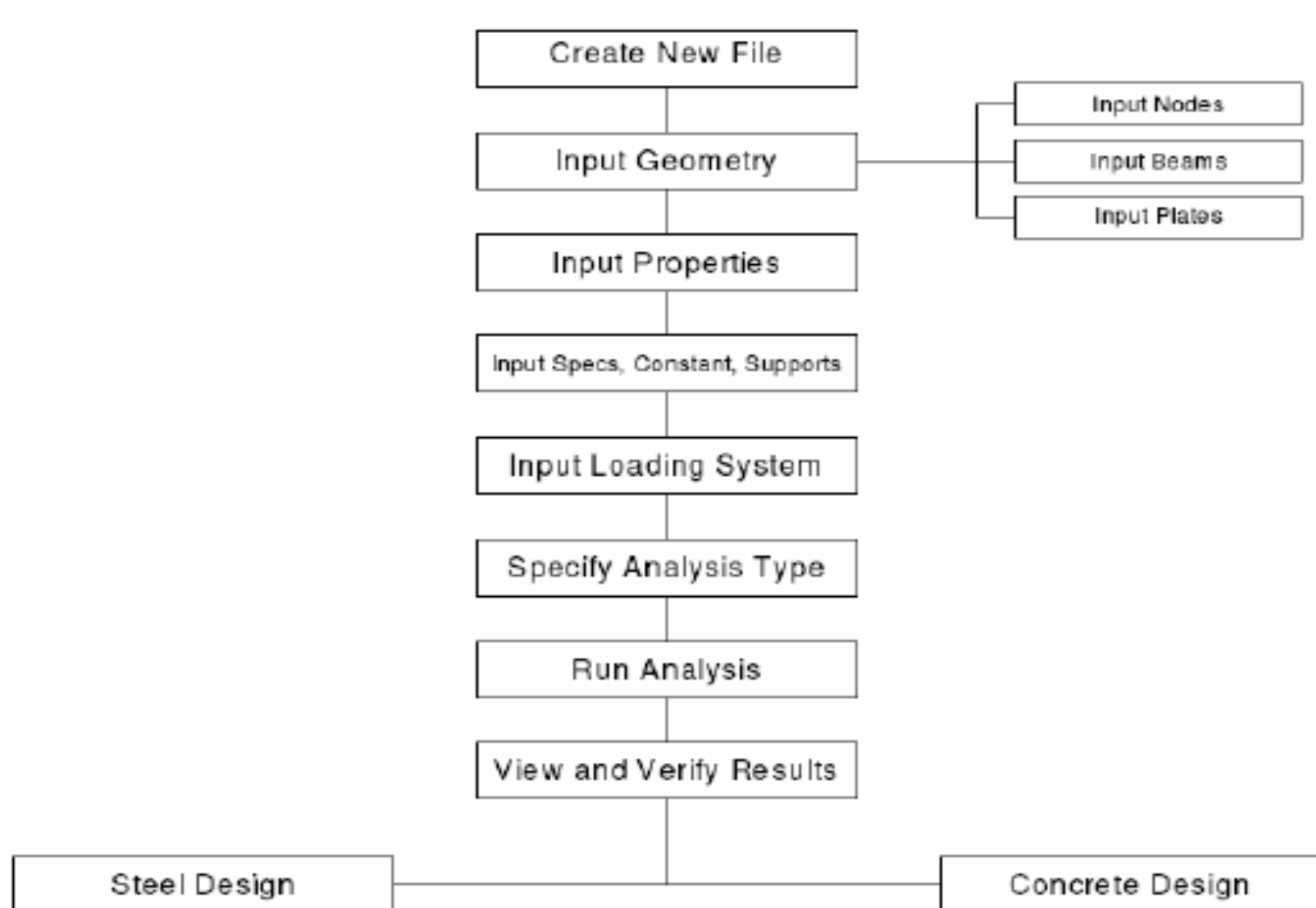
Type	LC	Name
Primary	1	(1.4DL + 1.7LL)
Primary	2	(0.9(1.4DL + 1.7LL + 1.7WL))

Nodes

Node	X (m)	Y (m)	Z (m)
1	0.000	0.000	0.000
2	5.400	0.000	0.000
3	11.400	0.000	0.000
4	0.000	0.000	7.200
5	5.400	0.000	7.200
6	11.400	0.000	7.200
7	0.000	3.600	0.000
8	5.400	3.600	0.000
9	11.400	3.600	0.000
10	0.000	3.600	7.200
11	5.400	3.600	7.200
12	11.400	3.600	7.200
13	5.400	7.200	0.000
14	11.400	7.200	0.000
15	5.400	7.200	7.200
16	11.400	7.200	7.200

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STAAD.Pro for Windows: Release 2000

Staad Analysis & Design Steps



Thank You !